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FOOD ENGINEERING

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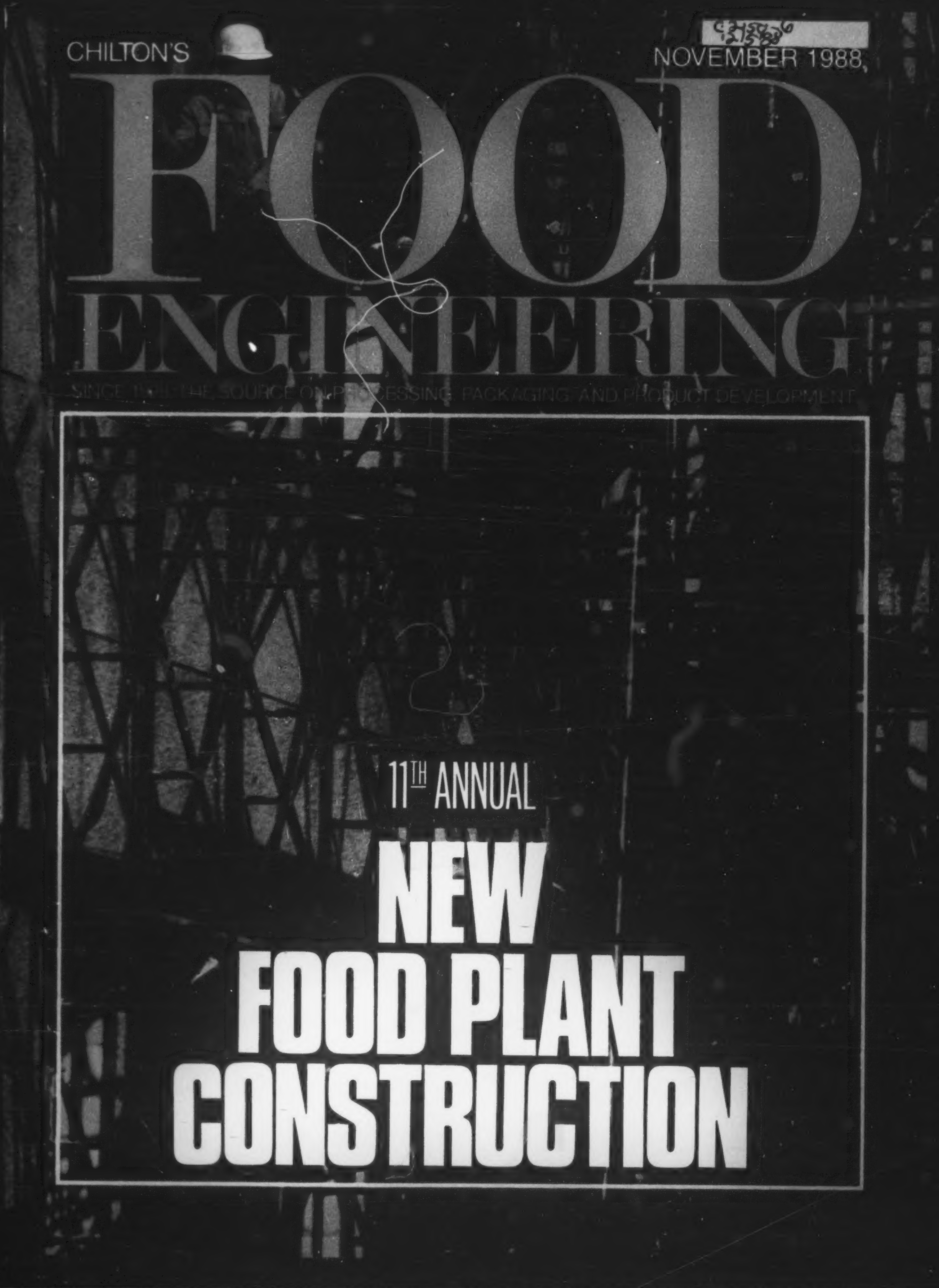

11TH ANNUAL

NEW FOOD PLANT CONSTRUCTION

FOOD ENGINEERING

COVER STORY

This year's new food plant survey reveals a record 369 projects – 30 more than last year.

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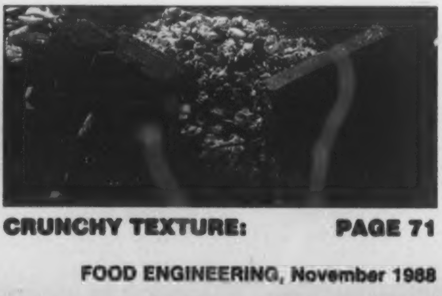

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Special Emphasis

CLEANING AND SANITATION

The food and beverage industry is turning to the use of computerized maintenance management systems to make its maintenance procedures more effective.

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NEW FOOD PLANTS

11th ANNUAL NEW PLANT SURVEY

New construction and major expansions continue at a record pace in spite of rising interest rates. Here's the recap of who's building what, when and where.

After the record 339 projects reported in *Food Engineering*'s 10th annual new plant survey last November, we expected the food industry construction boom to cool as the prime rate rose 2½ points over the past two years and returned to double digits (10 percent) earlier this year.

It didn't happen. "Financing for most of these projects was probably firmed-up before interest rates rose," observes one engineer at a major A/E firm.

Result: This year's new plant survey, compiled from several *Food Engineering* studies (including one for *FE* by Conway Data, Inc., Norcross, GA), reveals a record 369 projects – 30 more than last year. Of these, 187 – or 51 percent – are new or "greenfield" projects, remarkably consistent except for 1987 with earlier surveys which averaged a 50/50 ratio of new construction to major expansion/renovations. (New construction lurched up to 58 percent of the total last year.)

The survey further confirms industry trends and building trends noted last year:

- Fresh, frozen, "natural:" Of the 369 projects reported, no less than 72 – nearly 19 percent – are free-standing distribution centers (i.e., not part of a manufacturing plant project). Most of these are for refrigerated and frozen foods, confirming and continuing the trends away from canned toward frozen, and toward more "natural" fresh produce and deli entrees.
- Low-cal/low-cholesterol: The trend away from red meat and toward more poultry was confirmed over the past four years as 85 poultry plant projects were tallied in 1985-87 and 20 more were added this year. Now, seafood plants are proliferating, with catfish taking the lead. Of the 369 projects, 26 (7 percent) are seafood plants; of the 26, nine are catfish processors, confirming the boom in the catfish industry which is processing 8 million lbs. per week (*FE* August '88). But red meat is making a comeback: 27 of the projects listed are meat processing plants, mostly for value-added products.
- Fewer & bigger plants: The era of the billion-dollar food plant is here. As reported earlier *by Food Engineering* (March '88) the first known food plant project to reach the billion-dollar benchmark is the Coors Shenandoah Brewery at Elkton VA, which is being built in stages and will total about $1 billion when completed, probably in the early '90s. Now Kellogg has announced plans to build a $1.2-billion cereal plant at Memphis.

In the final column of the following tables, project status and date are coded as follows: Plng. (site selected but construction not yet underway); Const. (construction underway); Comp. (project completed); and Stup. (actual or projected startup dates of new manufacturing plants); Rpt. (date reported where status unknown).

CHARLES E. MORRIS
Midwest Editor

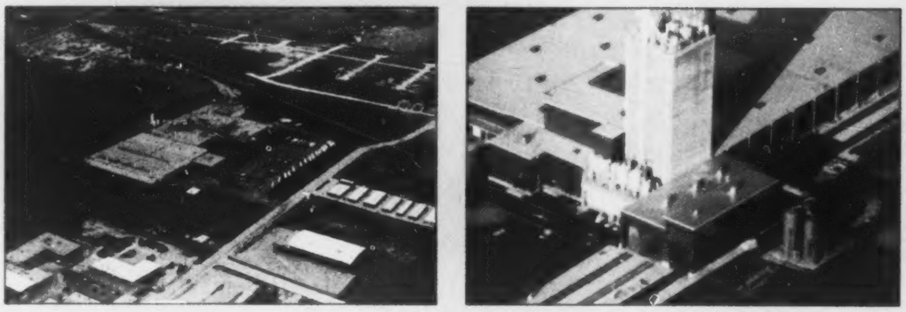
Model of the renovated Anheuser-Busch brewery adjacent to Busch Gardens in Tampa, FL, as it will appear when the $45-million expansion renovation project is completed early in 1990. (Photo: Lockwood Greene)

NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
A								
AA Farm Fresh Eggs	Elkton, MI	Eggs	New	–	54	–	–	Plng. 9/87
Adam Baum Egg Farms	Varick, NY	Eggs	Exp.	331	14.7	80	–	Plng. 5/88
Adolph Coors	Elkton, VA	Beer	Exp.	66	20	–	Sverdrup	Comp. '86
Advance Meat Co	Enid, OK	Proc. meats	Exp.	–	–	150	–	Comp. 7/88
A.E. Staley	Decatur, IL	Corn oil	Exp.	2	14	–	C.W. Nofsinger	Comp. 7/87
A.E. Staley	Louden, TN	HFCS	Exp.	–	–	–	–	Rpt. 8/88
Agri-Development	Richfield, UT	Proc. veg.	New	–	10.5	125	–	Plng. 1/88
Albertson's	Brea, CA	Groc. dist.	Exp.	346	11	35	A. Epstein & Sons	Comp. 5/89
Albertson's	Roseville, CA	Groc. dist.	New	275	16.3	40	A. Epstein & Sons	Stup. 10/89
Albertson's	Boise, ID	Sundries	Exp.	54	1.6	8	A. Epstein & Sons	Comp. 2/88
Albertson's	Fort Worth, TX	Groc. dist.	New	730	35	55	A. Epstein & Sons	Stup. 11/89
Albertson's	Gresham, OR	Groc. dist.	New	550	25	25	A. Epstein & Sons	Stup. 10/88
Albertson's	Salt Lake, UT	Food dist.	Exp.	70	5	10	A. Epstein & Sons	Comp. 11/88
Ale-8-One-Bottling	Winchester, KY	Soft drinks	Exp.	40	1.4	–	–	Plng. 11/87
Allen Corp.	Indianola, MS	Catfish proc.	Exp.	–	1	75	–	Rpt. 11/87
Americana Foods	Dallas, TX	Yogurt, dairy	Exp.	75	4.5	–	Patterson Ent.	Comp. 5/88
American Food Service	San Bernardino, CA	Prep. foods	Exp.	–	–	–	–	Plng. 2/88
American Italian Pasta	Excelsior Sprgs., MO	Pasta	New	125	27	–	Younglove	Stup. 8/88
American Maize-Products	Hammond, IN	Corn starch	Exp.	35	35	600	Process Systems Inc.	Phase 1 6/89
Americold, Inc.	Fogelsville, PA	Frzn. food dist.	Exp.	102	–	–	The Stellar Group	Comp. 8/88
Anheuser-Busch	Forest Park, GA	Bakery prod.	Exp.	54	–	–	Webber/Smith Assoc.	Comp. Fall '88
Anheuser-Busch	Ft. Collins, CO	Beer	New	780	300	550	MK-Ferguson	Stup. 3/89
Anheuser-Busch	Tampa, FL	Beer	Exp.	47	45	49	Lockwood Greene MK-Ferguson	Stup. 3/90
Anheuser-Busch	Cartersville, GA	Beer	New	860	250	500	MK-Ferguson	Const. 9/91
Anheuser-Busch	St. Louis, MO	Beer	Exp.	–	259	–	MK-Ferguson	Continuing
Anheuser-Busch	Newark, NJ	Beer	Exp.	–	–	–	MK-Ferguson	Comp. '91
Anheuser-Busch	Houston, TX	Beer	Exp.	–	100	115	–	Comp. 12/87
Assoc. Milk Producers	Stephensville, TX	Cheese	New	90	–	–	Webber/Smith Assoc.	Stup. 3/89
Atlantic Cold Storage	Miami, FL	Frzn. food dist.	Renov.	–	–	–	The Stellar Group	Comp. 8/88
B								
Bake-Line	Des Plaines, IL	Whse./dist.	Exp.	[illegible]	1.2	15	A. Epstein & Sons	Comp. 12/87
Balanced Energy	Clinton, IA	Feed	New	–	5	30	–	Comp. 11/87
Banquet Foods	Macon, MO	Frzn. meat products	Exp.	–	–	98	–	Plng. 9/87
Barber Dairies	Birmingham, AL	Ice Cream	Exp.	2	–	–	Webber/Smith Assoc.	Comp. 6/88
Beef Specialists/Iowa	Hartley, IA	Beef Proc.	Exp.	25	2	100	–	Comp. 12/87
Ben E. Keith Beers	Ft. Worth, TX	Beer dist.	New	210	8	35	–	Plng. 11/87
Big Bear	Ohio	Produce dist.	Renov.	80	–	–	Hixson	Comp. '88
Blue Channel Farms	Tippo, MS	Catfish proc.	New	–	1.4	105	–	Plng. 11/87

NEW FOOD PLANTS

Right: Ocean Spray cranberry juice plant at Kenosha, WI underwent a $3 million expansion completed in May. Far right: $10 million expansion of Hills Pet Products plant at Bowling Green, KY was completed earlier this year. (Photos: Sverdrup Corp.)



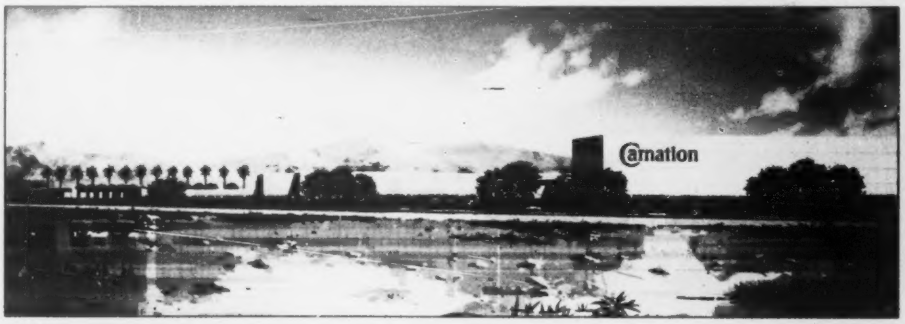
Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Borden	Menands, NY	Milk	Exp.	7	–	–	Webber/Smith Assoc.	Comp. 5/88
Borden/Superior Dairy	Austin, TX	Milk	New	50	–	–	Hixson	Stup. '88
Bridgeford Foods	Chicago, IL	Dry sausage	Renov.	72	0.15	6	A. Epstein & Sons	Comp. 4/88
Broughton Foods	Charleston, WV	Dairy prod.	Exp.	-	1.5	10	–	Comp. 12/87
B&R Pet Supply	Santa Clara, CA	Pet food dist.	New	–	–	–	–	Plng. 5/88
Bunker Hill Foods	Bedford County, VA	Canned beef	Exp.	–	–	75	–	Rpt. 7/88
Burgess Wholesale	London, ON	Food dist.	New	50	–	35	–	Plng. 12/87
Burkhardt Distribution	St. Augustine, FL	Bev. dist.	New	35	1.3	–	Patterson Ent.	Comp. 11/88
Burris Foods	Federalsburg, MD	Frzn. food dist.	Exp.	65	–	–	The Stellar Group	Comp. 8/88
Byrne Dairy	Syracuse, NY	Dairy prod.	Exp.	–	6	–	–	Const. 5/88

C

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Cain's Coffee	Oklahoma City, OK	Coffee, tea	New	–	2	–	–	Rpt. 8/87
Cajoleben Corp.	Riverside Cty, CA	Proc. foods	Exp.	–	–	–	–	Plng. 2/88
Cajun Coast	Abbeville, LA	Seafood	New	–	5.5	1000	–	Const. 11/87
Cake Stylists	Maspeth, NY	Bakery prod.	Exp.	7	1.5	15	–	Plng. 5/88
Caldwell Co.	Windom, MN	Proc. beef	Exp.	–	1.7	23	–	Comp. 12/87
Cal-Ida	Gooding, ID	Proc. potatoes	New	80	–	300	–	Plng. 8/87
Callaway Farms	Crawfordville, GA	Turkey proc.	New	–	–	300	–	Plng. 7/88
Cal-Mine Foods	Edwards, MS	Eggs	New	–	7	100	–	Rpt. 11/87
Canada Dry	Orlando, FL	Bev. dist.	New	30	–	125	–	Plng. 5/88
Canadian Harvest USA	Cambridge, MN	Oat fiber	New	–	–	–	–	Stup. 12/88
Cargill	Devore, CA	Flour	New	–	–	35	Younglove	Stup. mid-'89
Cargill	Gainesville, GA	Hydrog. soybean oil	Exp.	–	–	–	–	Comp. 6/89
Cargill	Sidney, OH	Soybean oil	New	–	–	–	–	Stup. 6/89
Carnation	Bakersfield, CA	Ice cream	New	220	62	200	A. Epstein & Sons	Stup. 9/88
Carnation	Hamilton, NJ	Food dist.	New	413	20	53	–	Plng. 4/88
Carnation	Garland, TX	Food dist.	New	250	9	50	–	Const. 12/87
Carnation	Danville, VA	Fresh pasta	New	120	–	200	Webber/Smith Assoc.	Stup. sp/88
Carolina's Pride Seafood	Plymouth, NC	Proc. seafood	New	10	–	75	–	Plng. 11/87
Carrington Foods	Mobile, AL	Seafood	New	25	1	–	–	Plng. 11/87
Central Soya	Bellevue, OH	Soy proc.	New	26	21	20	–	Plng. 4/88
Central Soya	Chattanooga, TN	Canola oil	Exp.	–	–	–	–	Comp. 6/89
Central Valley Dairy	Tulare, CA	Cheese	New	172	28	125	–	Stup. 7/88
Chef Pierre	Forest, MS	Frzn. pies	Exp.	–	–	150	–	Rpt. 11/87

NEW FOOD PLANTS

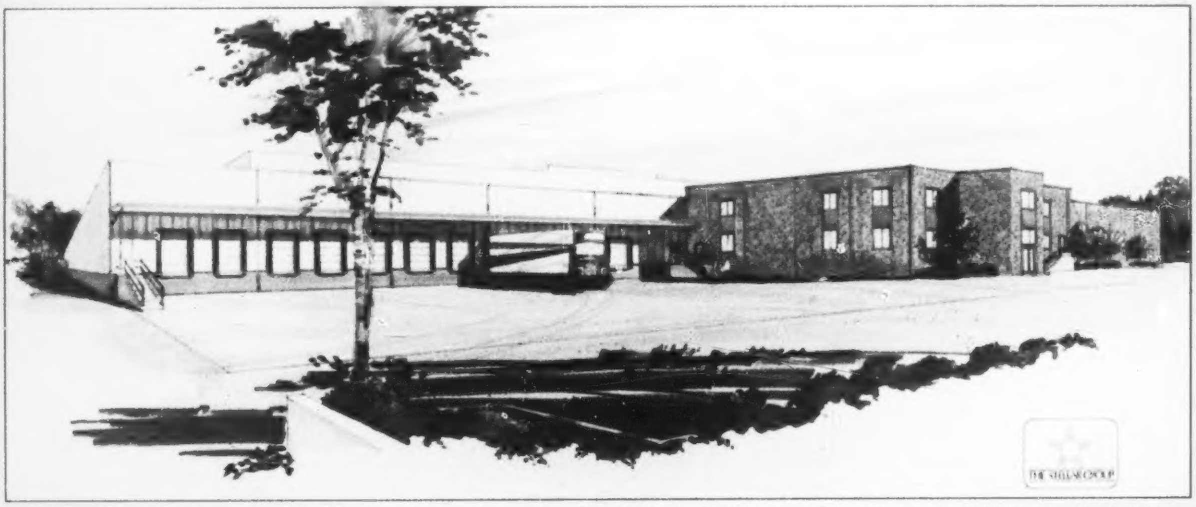
Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Clearwater Lobster	Arichat, NS	Lobsters	New	58	5.2	–	–	Const. 11/87
Coca-Cola	Solano County, CA	Beverages	New	–	–	–	–	Plng. 5/88
Coca-Cola	Richmond, VA	Soft drinks	New	300	15	75	–	Plng. 7/88
Coca-Cola Bottling	McAllen, TX	Soft drinks	Exp.	30	–	–	–	Plng. 12/87
Coca-Cola Enterprises	Enrico County, VA	Soft drinks	New	–	–	75	–	Rpt. 7/88
Colombo Baking	Alameda County, CA	Bakery dist.	Exp.	–	–	–	–	Plng. 2/88
Commercial Cold Storage	Atlanta, GA	Frzn. food dist.	Exp.	–	–	–	The Stellar Group	Comp. 8/88
ConAgra	S. Sioux City, IA	Oat proc.	New	–	12	35	Younglove	Stup. mid-'89
ConAgra	Crozet, VA	Frzn. foods	Renov.	–	–	–	The Stellar Group	Comp. 6/88
Contadina	Hanford, CA	Tomato prod.	Exp.	–	–	25	A. Epstein & Sons	Comp. 7/88
Controlled Atmosphere Pkg.	Prentiss, MS	Meat proc.	New	–	0.5	62	–	Plng. 5/88
Cook Family Foods	Lincoln, NE	Ham products	Exp.	–	11	190	–	Plng. 4/88
Cookies Unlimited	Brentwood, NY	Cookies	Exp.	15	1.3	53	–	Plng. 5/88
Cooper Farms	Celina, OH	Turkey proc.	New	–	–	250	–	Plng. 4/88
Cornland Beef Industries	Lexington, NE	Cattle proc.	Exp.	–	0.7	105	–	Plng. 7/87
Country Fresh Catch	Moberly, MO	Catfish proc.	New	60	7	300	–	Const. 9/87
Countrymark	Lima, OH	Feed	New	–	3	25	–	Const. 8/88
Country Skillet Catfish	Isola, MS	Catfish proc.	Exp.	–	5.5	250	–	Rpt. 11/87
County Beverage	Lee's Summitt, MO	Bev. dist.	Exp.	–	5	70	–	Rpt. 7/88
CPC International	Stockton, CA	HFCS	Renov.	–	–	–	Process Systems Inc.	–
CPC International	Argo, IL	HFCS	Renov.	–	–	–	Fluor Daniel	Continuing
CPC International	Asheboro, NC	Soups, sauces	New	140	–	60	Fluor Daniel	Stup. 8/88
Creative Contract Pkg.	Aurora, IL	Dry foods	New	70	–	–	–	Plng. 11/87
Crompton & Knowles Ingredient Tech. Div.	Mahwah, NJ	Ingredients R&D, pilot	New	118	–	150	–	Stup. 1/89
Crossroads Canning	Cuero, TX	Canned bev.	Exp.	7	1.2	5	–	Plng. 12/87
C&S Wholesale Grocery	Brattleboro, VT	Groc. dist.	Exp.	93	6	50	St. Onge, Ruff	Comp. 10/88
Curtis Packing	Tifton, GA	Meat dist.	Exp.	–	–	–	The Stellar Group	Comp. 2/88



Artist's rendition of new $62 million, 220,000 sq.-ft. Carnation Co. ice cream plant at Bakersfield, CA, which started up in September. (Photo: A. Epstein & Sons)

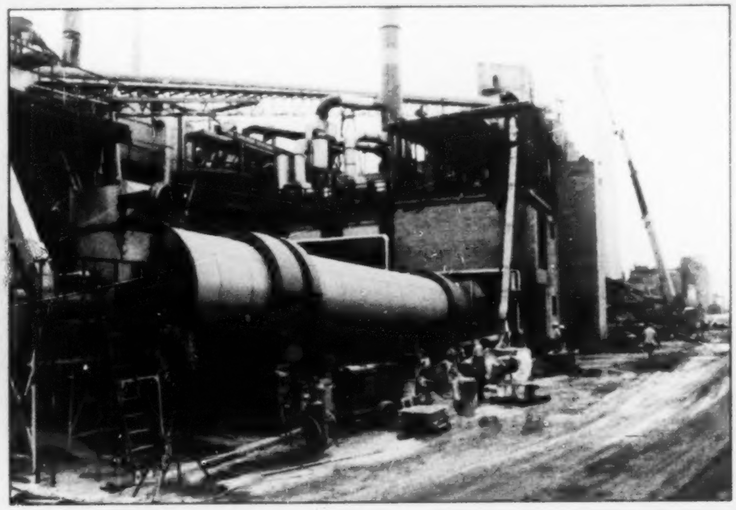
NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
D								
Dairymen	Greensboro, NC	Ice Cream	Exp.	10.5	–	–	Hixson	Comp. '88
Dairymen	Wilkesboro, NC	Ice Cream	Exp./Renov.	3.4	–	–	Hixson	Comp. '87
Dairymen's Coop	Tulare, CA	Cheese	New	185	12	180	–	Stup. 10/87
Dairy Products Co-op	Saskatoon, SK	Milk prod.	New	120	15	80	–	Plng. 11/87
Darling Delaware	Saskatoon, SK	Rendering	New	–	13	40	–	Plng. 7/88
Dean/Reiter Dairy	Springfield, OH	Ice cream	New	20	–	–	Hixson	Stup. '88
Decaffienated Coffee Co.	New Orleans, LA	Coffee	New	100	13	70	–	Plng. 12/87
Delicato Vineyards	San Joaquin, CA	Wine	Exp.	–	–	–	–	Plng. 2/88
Delta Oil Mill	Jonestown, MS	Cottonseed prod.	Exp.	40	1.2	15	–	Comp. 11/87
DeRosa Foods	Omaha, NE	Pasta	Exp.	–	16	125	–	Rpt. 8/88
Doane Products	Temple, TX	Pet food	New	89	4.5	35	–	Comp. 11/87
Domaine Mumm	Napa County, CA	Wine	New	–	–	–	–	Plng. 4/88
Dona Ana Specialty Flour	Rincon, NM	Flour	New	10	2.5	20	–	Rpt. 8/88
Dreyers Grand Ice Cream	Union City, CA	Ice cream	New	60	12	–	The Austin Co.	Stup. 3/89
Dubuque Packing Co.	Norfolk, NE	Meat proc.	Exp.	–	11	450	–	Const. 11/87
Dupaco	Wichita, KS	Meat proc.	Exp.	–	–	150	–	Plng. 5/88
DuQuoin Packing Co.	DuQuoin, IL	Meat prod.	Exp.	–	0.5	60	–	Plng. 4/88
E								
Eagle Snacks	Visalia, CA	Snack Food	New	310	26	300	–	Const. 11/87
East Coast Fish & Scallop	Newport News, VA	Seafood proc.	New	–	–	35	–	Rpt. 8/88
East-West Interfoods	Radisson, NY	Frzn. Chinese	New	13	2.8	25	–	Plng. 7/87
Egg Products	Blackshear, GA	Egg proc.	New	–	–	60	–	Rpt. 12/87
Ermark	Harrisburg, PA	Liquor candy	New	–	10	100	–	Const. 8/88



New 117,000 sq.-ft. frozen food distribution center operated by United States Cold Storage, Inc. started up in February 1988 at Lumberton, NC. (Photo: The Stellar Group)

NEW FOOD PLANTS

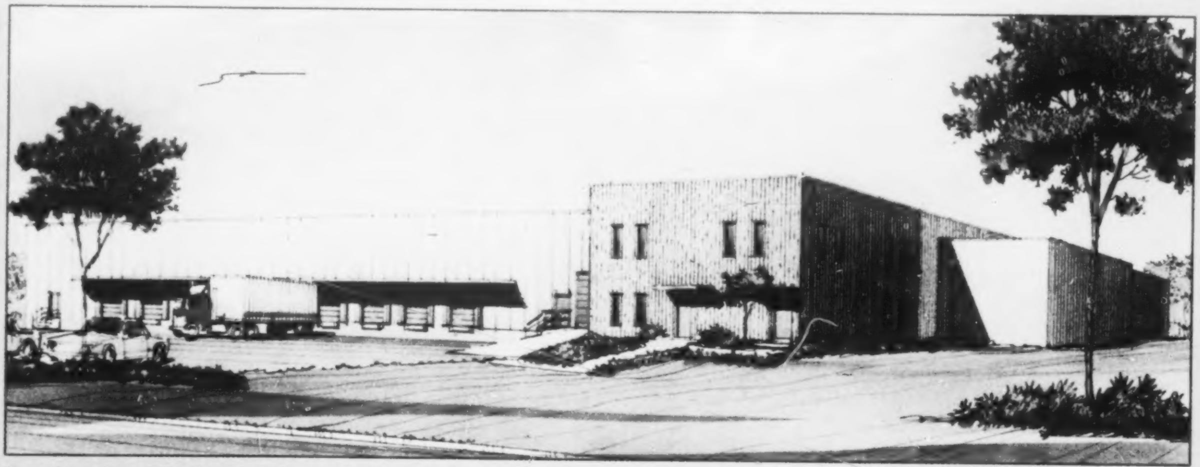


A.E. Staley boosted corn oil yields and germ recovery with new processing equipment and distributed process controls as part of a $14 million expansion completed in July 1987 at its plant in Decatur, IL. (Photo: C.W. Nofsinger Co.)

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
F								
Fantis Foods	Montreal, QU	Feta cheese	New/renov.	5	0.5	–	Mead & Hunt	Stup. Fall '89
Fehrmead Foods	Bryan, TX	Buns	New	40	8	65	–	Comp. 11/87
First Fisheries Development	New Orleans, LA	Fish proc.	New	40	12	75	–	Plng. 2/88
Fishco	Belzoni, MS	Catfish proc.	New	–	7.5	432	–	Rpt. 11/87
Fishery Inv.	Mulgrave, NS	Clam proc.	New	–	50	–	–	Const. 11/87
Flavorland	Forest Grove, OR	Dehy. corn	Exp.	–	2	15	–	Plng. 4/88
Fleischmann's Yeast	Memphis, TN	Yeast	New	–	20	40	–	Const. 8/88
Fleming Cos.	Cecil County, MD	Dist. center	New	–	–	–	Webber/Smith Assoc.	Comp. 4/89
Fleming Foods	Fresno County, CA	Dist. center	Exp.	–	–	–	–	Plng. 2/88
FreshNes Foods	Solon, OH	Refrig. entrees	Exp.	25	12	30	Lockwood Greene	Comp. mid-'88
Frito Lay	Perry, GA	Snack foods	New	–	–	–	Fluor Daniel	Rpt. 9/88
Frito Lay	Frankfort, IL	Snack foods	Exp.	–	–	200	–	Comp. 10/87
G								
Gallo	Stanislaus County, CA	Wine dist.	Exp.	–	–	–	–	Plng. 2/88
Gallo	Portland, OR	Wine dist.	New	40	2.3	50	–	Const. 12/87
General Foods	Jonesboro, AR	Proc. foods	New	250	–	30	A. Epstein & Sons	Stup. 1/90
General Foods/Birdseye	Fulton, NY	Frzn. fruits/veg.	Exp.	40	3	150	–	Comp. 11/87
General Foods/ Maxwell Hse.	Houston, TX	Inst. coffee	Exp.	–	–	–	–	Plng. 12/87
General Mills	Covington, GA	Cereals	New	200	100	110	Lockwood Greene	Stup. late '89
Georgia Feed Products	Cuthbert, GA	Poultry feed	New	40	10	50	–	Plng. 2/88
Gilster-Mary Lee	Perryville, MO	Dist. ctr. (Cake mix)	Exp.	56	–	–	–	Const. 9/87
Glico Foods	Haines City, FL	Grapefruit proc	New	–	4	40	–	Plng. 5/88
Godchaux Henderson	Reserve, LA	Corn syrup	New	–	55	1000	–	Plng. 8/88
Golden Cheese California	Corona, CA	Cheese	Exp.	–	–	–	–	Plng. 2/88
Golden State Foods	City Industry, CA	Food dist.	New/renov.	114	–	–	The Austin Co.	Comp. 10/87

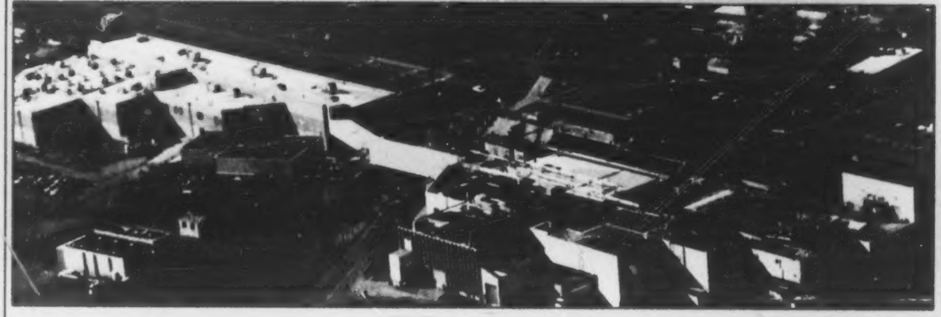
NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Golden Valley Foods	Clinton, MO	Proc. cheese	New	–	–	120	–	Comp. 9/87
Golden Guernsey	Madison, WI	Juices	Exp.	10	2.5	–	Mead & Hunt	Stup. Fall '89
Gold Kist	Sanford, NC	Chicken proc.	New	65	10	325	–	Rpt. 7/87
Goldsboro Milling	Goldsboro, NC	Turkey feed	New	–	7	10	Younglove	Stup. 9/88
The Granery/Walter Farms	Mexico, MO	Bird seed	New	–	–	50	–	Plng. 9/87
Grand Mesa Eggs	Grand Junction, CO	Eggs	New	111	3.4	25	–	Stup. 11/87
Greater Omaha Packing	Omaha, NE	Meat proc.	Exp.	–	3	35	–	Rpt. 8/88
Grand Union	Mt. Kisco, NY	Groc. dist.	Exp.	10	1	–	The Facility Group	Comp. 11/87
Grand Union	Newbergh, NY	Deli foods	New	–	–	–	–	Stup. 5/88
Grand Union	Newbergh, NY	Groc. dist.	Exp.	205	10.2	110	The Facility Group	Comp. 1/89
Grand Union	Waterford, NY	Groc. dist.	Exp.	137	8	–	The Facility Group	Comp. 9/88
Grand Union	Waterford, NY	Frzn. food dist.	Exp.	30	3	–	The Facility Group	Comp. 8/88
Great Lakes Chemical	Newport, TN	Sweetener	New	–	–	100	Process Systems Inc.	Stup. 6/88
Green Spring Dairy	Baltimore, MD	Milk, fruit juice	Exp.	23	–	–	JAI Engineers	Comp. 10/88
Grinsted Products	Johnson City, KS	Emulsifiers	New	65	18	–	The Austin Co.	Summer '89
Groff's	Brookshire, TX	Potato Chips	New	–	2	20	–	Comp. 12/87
H								
Hannaford Bros.	Schodack, NY	Groc. dist.	New	409	–	200	St. Onge, Ruff	Comp. 9/89
Harris Baking	Rogers, AR	Bread, buns	Exp.	–	5.3	15	–	Plng. 2/88
Helena Cotton Oil	Helena, AR	Cottonseed prod.	Exp.	–	2	–	–	Plng. 2/88
Hernke Foods	Hilbert, WI	Sauces	Exp.	20	1.5	–	Mead & Hunt	Comp. Smr. '89
Herr Foods	Chillicothe, OH	Potato chips	Exp.	–	2.2	–	–	Plng. 4/88
Hershey Canada	Smith Falls, ON	Roasted nuts	New	70	6	65	The Austin Co.	Stup. 7/88
Hills Bros.	Suffolk, VA	Coffee	New	660	–	350	–	Const. 4/88
Hills Pet Products	Bowling Green, KY	Dry pet food	Exp.	–	10	--	Sverdrup	Comp. 5/88



New $4 million, 90,000 sq.-ft. processed meats distribution center was started up by RCS-Smithfield at Smithfield, VA last June. (Photo: Patterson Enterprises)

NEW FOOD PLANTS

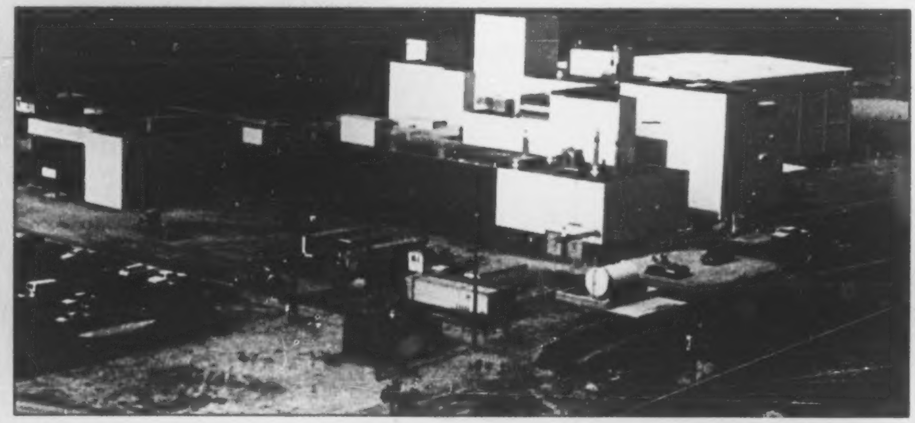


New 72,000 sq.-ft. Rocco turkey processing plant at Dayton, VA started up in January 1988. (Photo: Shillington & Associates)

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Hiram Walker	Fort Smith, AR	Liqueurs	Exp.	–	2	30	–	Rpt. 7/88
House of Raeford Farms	Raeford, NC	Turkey proc.	Exp.	–	–	100	–	Rpt. 11/87
Holly Farms	Crewe, VA	Chicken proc.	New	–	–	30	–	Rpt. 8/88
Hollywood Brands	Centralia, IL	Candy bars	Exp.	–	6	40	–	Rpt. 12/87
H. P. Hood	Dunedin, FL	Dairy prod.	Renov.	–	–	–	The Stellar Group	Comp. 6/88
Hudson Foods	Dexter, MO	Poultry hatch.	Exp.	–	10	100	–	Plng. 2/88
Hunt-Wesson	Stanislaus County, CA	Can.tomatoes	Exp.	–	–	–	–	Plng. 2/88
I								
Iams Co.	Aurora, NE	Pet food	Exp.	–	17.2	39	–	Plng. 2/88
IBP	Madison, NE	Meat proc.	Exp.	–	20	150	–	Rpt. 8/88
Igene Bio Tech	New York	Whey powder	Renov.	20	–	–	Hixson	Plng.
Ilinois Pork	Monmouth, IL	Pork proc.	New	200	5	375	–	Rep. 9/87
Industrial Cold Storage	Jacksonville, FL	FF dist.	Exp.	49	–	–	The Stellar Group	Comp. 5/88
Inland Coca-Cola	Boise, ID	Bev. dist.	New	51	1.8	–	–	Comp. 1/88
Iowa Ham Canning	Independence, IA	Hams	Exp.	30	–	20	–	Rpt. 9/88
J								
Jerome Foods	Fairibault, MN	Turkey proc.	Exp.	30	4.3	–	–	Plng. 8/88
John Culbertson Winery	Riverside County, CA	Wine	New	–	–	–	–	Plng. 4/88
John B. Sanfilippo	Bainbridge, GA	Nuts	New	–	10	200	–	Const. 12/87
K								
Kaufman Baking	Hebron, OH	Buns	Renov.	51	1+	–	The Austin Co.	Comp. 5/88
K. B. Specialty Foods	Greensburg, IN	Deli, entrees	Exp.	1.6	–	–	Hixson	Comp. '87
Keebler	Mariemont, OH	Dist. center	Exp.	20	1.8	8	A. Epstein & Sons	Comp. 10/88
Keebler	Ft. Worth, TX	Snack foods	New	146	7.7	12	A. Epstein & Sons	Stup. 10/88
Keeson Partners	Lakeover, MS	Cookie dist.	New	26	0.5	20	–	Const. 4/88
Kellogg	Battle Creek, MI	Cereals	Exp.	–	–	–	Fluor Daniel	Continuing
Kellogg	Memphis, TN	Cereals	New	–	1.2 billion	–	–	Plng. 2/88
Kerry Foods	Jackson, WI	Dried ingred.	Exp.	25	5	–	Mead & Hunt	Comp. 7/88
Kohnan, Inc.	Napa, CA	Sake	New	–	6	–	–	Plng. 10/87
Kraft	Greeneville, TN	Cheese	Exp.	5	3	25	–	Const. 11/87
Kraft	N. Lawrence, NY	Dairy prod.	Exp.	20	–	–	Hixson	Comp. '88
Kroger	Solon, OH	Frzn. bakery	Renov.	26	–	–	Hixson	Comp. '88

NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
			L					
Lancer Corp.	San Antonio, TX	Bev. dist.	New	–	–	–	–	Plng. 12/87
Land 'O Lakes	Eau Claire, WI	Powdered milk	Exp.	–	5	60	–	Plng. 1/88
Lender's Bagel Bakery	Hartford, CT	Bagels	New	–	–	300	–	Plng. 1/88
Leprino Foods	King's County, CA	Proc. cheese	Exp.	–	–	–	–	Plng. 2/88
Leprino Foods	Kissimee, FL	Cheese dist.	Exp.	96	2	80	–	Rpt. 12/87
Leprino Foods	Poinciana, FL	Cheese	New	66	–	100	–	Plng. 12/87
Leprino Foods	Allendale, MI	Cheese	New	190	27	200	Mead & Hunt	Stup. Fall '89
Leprino Foods	Remus, MI	Mozz. cheese	Exp./Renov.	7.5	2	–	Mead & Hunt	Comp. Fall '89
LinPep	Lincoln, NE	Soft drinks	Exp.	–	3.7	33	–	Plng. 4/88
L. J. Minor	Celina, OH	Food bases	Exp.	–	–	–	–	Const. 8/88
Loma Linda Foods	Riverside, CA	Milk	Exp.	–	–	–	–	Plng. 2/88
Louis Rich	Tulare, CA	Turkey proc.	Exp.	274	40	700	–	Const. 11/87
Louis Rich	Sedalia, MO	Turkey proc.	New	–	100	1000	–	Rpt. 7/88
			M					
Ma-Cor	Oklahoma City, OK	Spec. meats	New	66	–	35	–	Plng. 4/88
Maletis, Inc.	Portland, OR	Beer dist.	New	140	5	250	–	Plng. 5/88
Mama D'Angelo	Salt Lake, UT	Pizza	New	–	–	–	–	Const. 8/88
Mazza Cheese	Sumner, WA	Cheese	New	65	–	100	Hansen, Hansen & Johnson Niro Atomizer	Plgn. 7/87
McIlhenny Co.	Avery island, LA	Pepper sauce	New/renov.	50	3	–	The Austin Co.	Sprg. '89
McKee Baking	Stuarts Draft, VA	Bakery prod.	New	–	–	–	Fluor Daniel	Rpt. 9/88
Mead Foods	Bryan, TX	Bakery prod.	New	50	–	50	–	Const. 12/87
Meadowland Cremery	Conroe, TX	Milk, orange juice	New	120	–	–	Hixson	Stup. '87
Medallion Foods	Newport, AR	Mexican foods	New	–	1.5	35	–	Plng. 2/88
Merchant's Dist.	Hickory, NC	Frzn. food dist.	New	100	4.7	–	St. Onge, Ruff	Comp. 5/88
Metz Baking	Omaha, NE	Bakery prod.	Exp.	–	17	100	–	Plng. 11/87
Mike-Sell's Indiana	Indianapolis, IN	Snack food	New	45	–	–	–	Plng. 4/88
Miller Brewing	Milwaukee, WI	Beer	Exp.	–	26	–	–	Comp. 8/88
Miller Brewing	Watertown, WI	Beer	New	–	6	–	–	Plng. 12/87
Milton Waldbaum	Wakefield, NE	Egg proc.	Exp.	–	–	120	–	Const. 12/87



First *Knorr* brand soups, sauces and gravies plant in the U.S. was started up September 16 by CPC International at Asheboro, NC. 140,000 sq.-ft. plant was designed and built by Fluor-Daniel. (Photo: CPC International)

NEW FOOD PLANTS

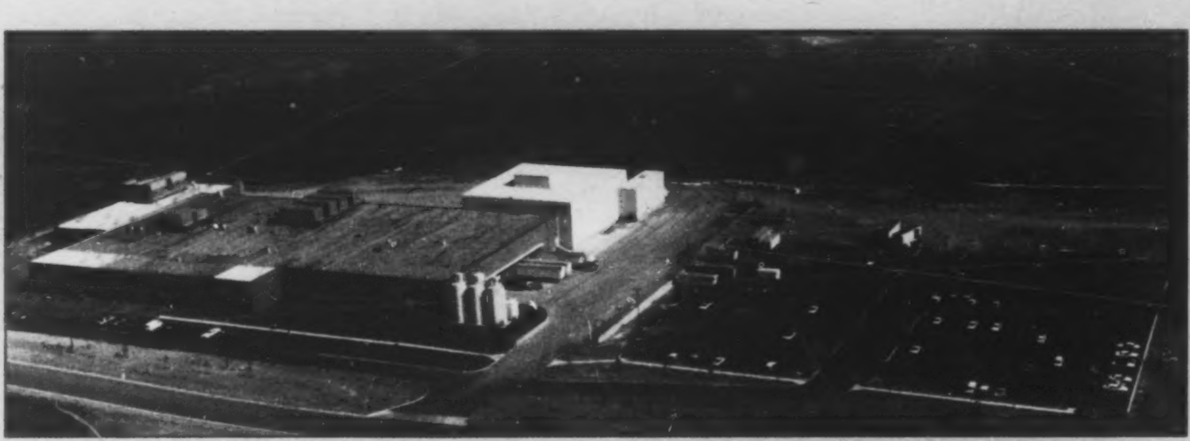
Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Mississippi Pride	Itta Bena, MS	Catfish proc.	New	—	2.2	103	—	Rpt. 11/87
M & M Mars	Waco, TX	Candy	Exp.	—	1	—	—	Plng. 12/87
Mock's Landing	Portland, OR	Soft drink dist.	New	140	2	—	—	Rpt. 7/88
Montfort of Colorado	Greeley, CO	Lamb proc.	New	74	6.5	150	—	Plng. 8/88
Morley Candy Makers	Clinton, MI	Candy	Exp.	75	—	—	—	Plng. 4/88
Morning Glory Div. AMPI	Hillsboro, WI	Cheese	Exp.	4.5	0.5	—	Mead & Hunt	Comp. Smr. '88
Mrs. Smith's	Pottstown PA	Frzn. waffles	Exp.	—	3.5	—	—	Plng. 12/87
Mrs. Smith's	Rossville, TN	Frzn. waffles	New/ Renov.	— —	— —	— —	Process Systems, Inc. Webber/Smith Assoc. Fluor Daniel	Stup. 9/88 Comp. Fall '88

N

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Nabisco	Naperville, IL	Cereals	Exp.	—	30	—	Sverdrup	Comp. 3/88
Nabisco	Garner, NC	Cookies	New	1100	600	650	—	Plng. 8/88
National Sea Products	Portsmouth, NH	Seafood	Exp.	—	—	—	—	Plng. 12/87
Nestec	St. Joseph, MO	Pet food	New	150	8	95	—	Plng. 4/88
Nestle	Alameda Cty, CA	—	New	—	—	—	—	Plng. 4/88
Nestle	Granite City, IL	Tea	Exp.	20	5	—	—	Const. 12/87
Nestle	Milledgeville, GA	Candy	New	387	—	500	—	Plng. 8/88
Net-Fresh	Port Arthur, TX	Seafood proc.	New	—	3	60	—	Const. 12/87
New Process Feeds	Greeneville, MS	Catfish feed	New	—	2.4	50	—	Rpt. 11/87
Niagara Candy & Ice Cream	Cheektowaga, NY	Candy, ice cream	Exp.	58	0.9	36	—	Plng. 5/88
Nichieri Co. of America	Fife, WA	Seafood proc.	New	—	8.5	70	—	Rpt. 12/87
Nickles Bakery	Lima, OH	Bakery prod.	Exp.	—	6	30	—	Plng. 1/88
Northeast Foods	Spotsylvania, VA	Buns	New	—	—	80	—	Plng. 2/88
Northeast Okla. Beef	Tulsa, OK	Beef proc.	New	—	15	255	—	Plng. 1/88
Nu-West, Inc.	Pascagoula, MS	Catfish proc.	New	—	—	—	—	Rpt. 7/88

O

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Ocean Spray	Babcock, WI	Fresh fruit	Exp.	—	—	—	Hixson	Comp. '87
Ocean Spray	Bordentown, NJ	Cranberry juice prod.	Exp./Renov.	—	5	—	Sverdrup	Comp. '88



New 120,000 sq.-ft. Carnation Co. fresh pasta plant started up last spring at Danville, VA. (Photo: Webber/Smith Associates.)

NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Ocean Spray	Kenosha, WI	Cranberry juice	Renov.	–	3	–	Sverdrup	Comp. '88
OCL Ind. Materials	Surrey, BC	Ingredients	Exp.	26	0.8	–	–	Const. 4/88
Ogilvie Mills	Keokuk, IA	Wheat starches	Exp.	–	–	–	Process Systems Inc.	Rpt. 8/88
Omaha Steaks Int'l	Omaha, NE	Pkgd. meats	Exp.	–	17.5	179	–	Plng. 11/87
Oxford Cheese	Oxford, NE	Cheese	Exp.	–	–	60	–	Const. 8/88
Oxnard Frozen Foods	Oxnard, CA	Frzn. foods	Exp.	–	–	–	–	Plng. 2/88
P								
Pennant South	Dalton, GA	Frzn. bakery mixes	New	–	2	25	–	Plng. 7/87
Pepsico	San Jonquin, CA	Dist. center	New	–	–	–	–	Plng. 5/88
Pepsi-Cola	Boone Cty., KY	Bev. dist.	New	91	–	–	–	Plng. 4/88
Pepsi-Cola	Cincinnati, OH	Bev. dist.	New	102	–	500	–	Plng. 5/88
Perdue Farms	Marson, NC	Feed blends	New	34	7	100	–	Stup. 11/87
Peterson Industries	Decatur, AR	Poultry feed	New/Exp.	–	5	8	Younglove	Comp. 11/88
Petit Jean Poultry	Buffalo, MO	Poultry	New	–	0.2	200	–	Stup. 11/87
Pilgrim's Pride	Mt. Pleasant, TX	Chicken proc.	Exp.	443	–	1800	–	Plng. 11/87
Pitman Farms	Madera Cty., CA	Proc. foods	Exp.	–	–	–	–	Plng. 2/88
Plantation Sysco	Ocoee, FL	Food dist.	New	205	–	–	H.J. High Const.	Comp. 11/87
Planters Life Savers	Holland, MI	Confections	Renov.	15	2	30	Lockwood Greene	Comp. 3/89
Planters Life Savers	Holland, MI	Confection dist.	Exp.	26	0.75	–	Lockwood Greene	Comp. 12/88
Planters Life Savers	Las Piedras, PR	Gum	Renov.	20	3	30	Lockwood Greene	Comp. 11/88
Power Packaging	Manteno, IL	Proc. food	New	110	3.7	10	A. Epstein & Sons	Stup. 8/87
Price Chopper Supermarkets	Colonie, NY	Frzn. food	Exp.	45	–	–	St. Onge, Ruff	Comp. 7/88
Procter & Gamble	Portsmouth, VA	Peanut butter	Exp.	17	4.5	15	–	Rpt. 8/88
Progressive Dist.	Winthrop, ME	Food dist.	New	225	–	170	St. Onge, Ruff	Comp. 6/89
Pure Food Co. (Herb Ox)	Wolcott, NY	Unreported	Exp.	–	–	65	–	Const. 5/88
PYA Monarch	Apopka, FL	Food dist.	Exp./renov.	2	–	–	H.J. High Const.	Comp. 8/88
Q								
Quaker Oats	Topeka, KS	Pet food	Exp.	6	8	30	–	Plng. 1/88
Quick Candy Co.	Marion, KY	Candy	New	–	2	200	–	Rpt. 7/88
Quik 'N' Tastee	Belyon, MO	Food dist.	New	–	8	208	–	Rpt. 7/88
R								
Rahr Malting Co.	Ogden, UT	Malt	New	–	30	20	–	Plng. 4/88
Ralston-Purina	Sharonville, OH	Cereals	Exp.	–	–	–	MK-Ferguson	Comp. 10/88
RCS-Smithfield	Smithfield, VA	Meat proc.	New	90	4	–	Patterson Ent.	Comp. 6/88
R.J. MacKoul	Worcester, MA	Food proc.	Exp.	50	2.5	–	St. Onge, Ruff	Stup. 5/89
Robert Gooch Enterprises	Enid, OK	Low-fat meats	New	140	8	400	–	Rpt. 9/87
Rocco Turkeys	St. Pauls, NC	Turkey proc.	New	–	15	300	–	Rpt. 12/87
Rocco Turkeys	Dayton, VA	Turkey proc.	New	72	–	–	Shillington Assoc.	Stup. 1/88
Rocco Farm Foods	Shenandoah, VA	Chicken proc.	New	–	–	1000	–	Plng. 11/87
Rosina Food Products	Cheektowaga, NY	Proc. meats	Exp.	7	1.4	25	–	Plng. 5/88

NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Rowe Manufacturing	Newbern, TN	Pork proc.	New	200	–	250	Carlson Assoc. The Facility Group	Stup. 10/88
Royal Dutch Products	Deland, FL	Cheese	Exp.	60	–	–	–	Plng. 8/88
Royal Gulf Tuna/ Swordfish	Terrebone Psh., LA	Fish proc.	New	–	4	–	–	Plng. 7/87
Ruiz Foods	Tulare, CA	Frzn. Mexican	Exp.	30	4	–	–	Comp. 11/87
Ryan Milk Co.	Murray, KY	Milk	Exp.	--	8.5	–	–	Plng. 5/88

S

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Sal's Food Products	Lakeland, FL	Frzn. entrees	New	–	–	60	–	Plng. 5/88
Sandoz Nutrition	St. Louis Park, MN	Dietary foods	Exp.	14	1.6	–	Schipke Engineers	Comp. 4/88
San Luis Sourdough	San Luis Obispo, CA	Bread	Exp.	20	–	–	–	Plng. 5/88
Sanofi Bioingredients	Germantown, WI	Ingredients	Renov.	10	–	45	Heike Design Assoc.	Comp. 5/89
Sanofi Bioingredients	Waukesha, WI	Ingredients	Exp.	10	1	215	Heike Design Assoc.	Comp. 5/89
Sara Lee	Tarboro, NC	Bakery prod.	New	–	60	600	Fluor Daniel	Rpt. 9/88
Sara Lee	Winston-Salem, NC	Dist. center	New	–	–	–	–	Plng. 7/88
Seaboard Cold Stge.	Lakeland, FL	Citrus, meat dist.	Exp.	50	2.2	–	Patterson Ent.	Comp. 4/88
Seaboard Feeds	Chattanooga, TN	Feed	New	–	4	8	Younglove	Stup. 12/88

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NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
Seaboard Tampa Terminals	Tampa, FL	Ref. dist.	New	430	–	–	The Stellar Group	Comp. 4/88
Seafood Cannery	Steinhatchee, FL	Crab proc.	New	–	0.2	60	–	Rpt. 8/88
Sebastiani Vineyards	San Joaquin, CA	Wine	Exp.	–	–	–	–	Plng. 2/88
Select Cheese Co.	Turlock, CA	Cheese	New	22	2	30	–	Plng. 8/88
Shearer's Foods	Brewster, OH	Potato chips	Exp.	18	1.2	–	–	Plng. 4/88
Shenandoah' s Pride Dairy	Harrisonburg, VA	Milk, UHT prod.	New	106	–	–	JAI Engineers	Stup. 10/88
Shining Ocean	Seattle, WA	Surimi	New	–	–	–	–	Rpt. 12/87
Sierra Nevada	Butte Cty., CA	Beer	Exp.	–	–	–	–	Plng. 2/88
Sierra Pacific	Stanislaus Cty., CA	Food dist.	New	–	–	–	–	Plng. 5/88
Sims Bros. Seafood	Delcambre, LA	Shrimp	Exp.	–	–	30	–	Rpt. 7/88
Sinskley Winery	Napa Cty., CA	Wine	New	–	–	–	–	Plng. 4/88
Sioux Honey Assn.	Sioux City, IA	Honey	Exp.	–	5	50	–	Comp. 12/87
Skalli Corp.	Napa Cty., CA	Wine	Exp.	–	–	–	–	Plng. 2/88
Smelkinson/Sysco	Jessup, MD	Foodservice dist.	New	240	16	410	St. Onge, Ruff	Comp. 12/88
SNG	Seattle, WA	Seafood proc.	New	–	–	–	–	Rpt. 12/87
Southeastern Spec. Foods	Ellisville, MS	Muscadine prod.	Exp.	–	3	70	–	Plng. 5/88
South Fresh Farms	Indianola, MS	Catfish proc.	New	–	1.6	55	–	Rpt. 11/87
Southwestern Premier	Anadarko, OK	Peanut butter	New	–	–	17	–	Plng. 8/88
Springdale Dairy	Springdale, OH	Frzn. novelties	Exp./Renov.	3	–	–	Hixson	Comp. '87
Spring Valley Cheese	Chili, WI	Cheese	New	60	–	–	–	Plng. 1/88
Staley Continental	Atlanta, GA	Foodservice dist.	New	215	15	–	–	Comp. '89

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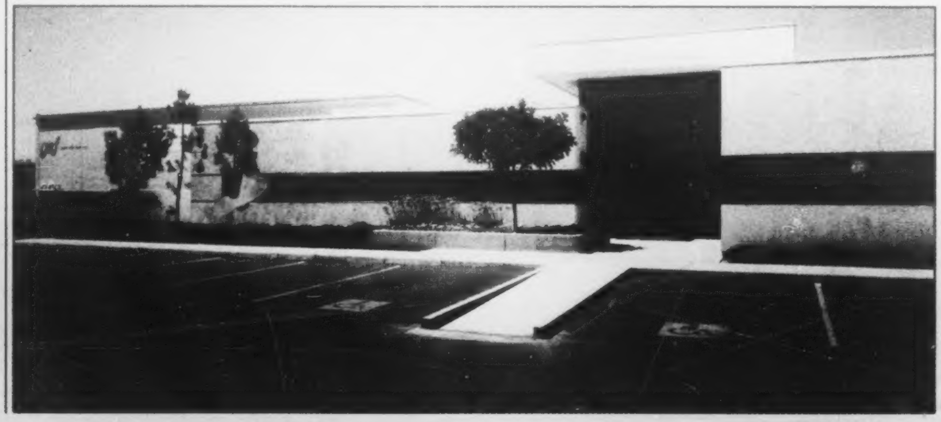
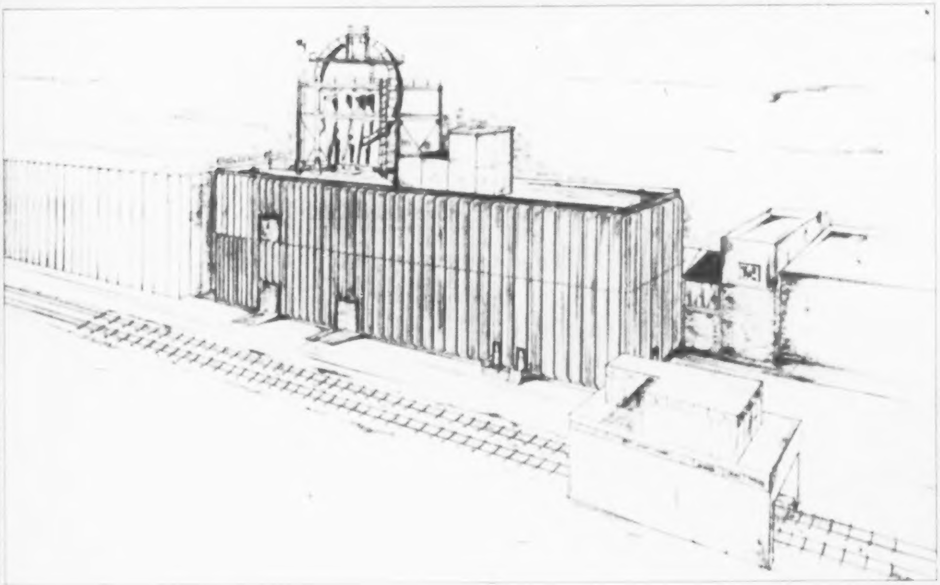
NEW FOOD PLANTS

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Staley Continental	Minneapolis, MN	Foodservice dist.	New	215	15	–	–	Comp. '89
Staley Continental	Mechanicsburg, PA	Foodservice dist.	New	104	10	–	–	Comp. '89
Star Markets	Norwood, MA	Food dist.	Exp.	123	6	–	St. Onge, Ruff	Comp. 10/88
Sterling Winery	Napa Cty., CA	Wine	New	–	–	–	–	Plng. 4/88
Stokely	DeForest, WI	Canned veg.	New	260	3	–	–	Const. 7/88
Stokely	Poynette, WI	Sauerkraut	New	68	–	56	–	Plng. 11/87
Stouffer's Foods	Springville, UT	Frzn. entrees	New	360	75	1200	Webber/Smith Assoc.	Stup. 11/87
Suiza Dairy	San Juan, PR	Milk, juice	Exp.	8	–	–	JAI Engineers	Comp. mid-'89
Sundor Brands	Chicopee, MA	Fruit juice	New	125	10	200	–	Plng. 4/88
Sunfield Foods	Sacramento, CA	Health foods	Exp.	52	–	25	–	Comp. 8/87
Super Valu Stores	New Stanton, PA	Frzn. food dist.	Exp.	23	1.8	–	Webber/Smith Assoc.	Comp. Smr. '88
Sweet Thanks Candy	Woods Cross, UT	Candy	Exp.	–		100	–	Const. 8/88
Swenson Bros.	Eugene, OR	Frzn. foods	Exp.	21	2	50	–	Const. 7/88
Swift-Eckrich	Huntsville, AR	Poultry proc.	Exp.	–	–	80	–	Plng. 2/88
Swift Independent	St. Joseph, MO	Ham boning	Exp.	–	10	135	–	Rpt. 8/88
Sysco/Gulf Atlantic	Jacksonville, FL	Food dist.	New	112	–	–	H.J. High Const.	Const. 9/88
Sysco/So. Florida	Miami, FL	Food dist.	New	75	–	–	H.J. High Const.	Const. 9/88
T								
Taggares/Quaker Oats	Bassett, NE	Frzn. potato prod.	Exp.	–	50	200	–	Rpt. 8/88
Tarin Meat Co.	San Antonio, TX	Proc. meats	New	23	1.2	–	–	Plng. 12/87
Treasure Valley Foods	Columbia, MS	Frzn. veg.	New	–	5	200	–	Comp. 8/88
Tropicana	Bradenton, FL	Orange juice	Exp./Renov.	25	5	–	Sverdrup	Comp. '88
Tulsa Turkey Products	Tulsa, OK	Turkey proc.	New	56	–	100	–	Rpt. 11/87
Turkey Hill Dairy	Conestoga, PA	Milk, ice cream	Exp.	54	–	–	JAI Engineers	Comp. mid-'89
U								
United Co-op	Bigelow, MN	Grain dist.	Exp.	–	–	–	Younglove	Comp. 11/88
United Refrig. Svcs.	Charlotte, NC	Food dist.	Exp.	30	1.3	–	Patterson Ent.	Comp. 10/88
United Refrig. Svcs.	Tarboro, NC	Bakery dist.	New	130	5	–	Patterson Ent.	Comp. 3/88
United States Cold Stge.	Lumberton, NC	Frzn. food dist.	New	117	–	–	The Stellar Grp.	Comp. 2/88
United States Cold Stge.	Nashville, TN	Frzn. food dist.	New	90	–	–	The Stellar Grp.	Comp. 5/88
United States Cold Stge.	Laredo, TX	Frzn. food dist.	Exp.	43	–	–	The Stellar Grp.	Comp. 1/89



The 80,000 sq.-ft. Golden State Foods distribution center at City of Industry, CA was recently renovated and 34,000 sq.-ft. added in a project completed in October 1987. (Photo: The Austin Co.)

NEW FOOD PLANTS



Artist's rendering of a $35 million expansion of American Maize-Products Co. expansion for specialty corn starches at Hammond, IN. Four-phase project will be completed late in 1993. (Photo: American Maize-Products)

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Universal Brands	Pompano Beach, FL	Beer dist	New	110	–	–	The Stellar Group	Comp. 4/88
Universal Foods	Juneau, WI	Dried foods	Exp.	–	4	–	–	Plng. 8/88
V								
Valley Grain Products	Henderson, KY	Masa flavor	New	–	–	–	Younglove	Phase I mid-'89
Valley Redfish Farm	Harlingen, TX	Redfish hatch.	New	–	2.5	–	–	Plng. 12/87
Valley Rich Dairy	Roanoke, VA	Milk, dairy prod.	Exp./Renov.	4.2	–	–	Hixson	Comp. '87
Val Ltd.	Lincoln, NE	Italian foods	New	–	3	30	–	Plng. 4/88
Vicking Salmon Corp.	Rich Passage, WA	Seafood proc.	New	–	1	3	–	Rpt. 12/87
Villarizza Vineyards	Hutchinson, KS	Wine	New	–	1	20	–	Plng. 1/88
Virginia French Winery	Whittaker's Mill, VA	Wine	New	–	6.3	–	–	Plng. 11/87
Vogel Popcorn	Hamburg, IA	Popcorn	Exp.	–	23	100	–	Plng. 8/88
W								
Weis Markets	Milton, PA	Groc. dist.	Exp.	200	–	–	St. Onge, Ruff	Comp. 9/88
Well Pet	Santa Clara, CA	Pet food	New	–	–	–	–	Plng. 5/88
Wilson Foods	Oklahoma City, OK	Shortening	Exp.	–	–	75	Process Systems, Inc.	Comp. 1/89
Williamson Fiber	Louisville, KY	Oat fiber	New	–	–	–	–	Rpt. 8/88
Winters Candy	Manteno, IL	Candy	Exp.	25	–	100	–	Const. 8/88
Wise Foods	Spartanburg, SC	Food proc.	Exp.	7	0.5	–	The Facility Group	Rpt. 8/88
Wis-Pak, Inc.	Watertown, WI	Soft drinks	Renov.	–	–	–	MK-Ferguson	Comp. 10/88
Wyeth-Ayerst Labs	Michigan	Infant formula	Exp./Renov.	300	–	–	Hixson	Plng. 9/88
Y								
Yoplait, Inc.	Los Angeles, CA	Yogurt	Renov.	–	1+	–	The Austin Co.	Comp. Fall '88

CHILTON'S

FOOD ENGINEERING

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1988 SALARY SURVEY

More than just money

FOOD ENGINEERING

COVER STORY
Food company wages this year continued to move ahead. Food job increases ran at an average of 7.8 percent, ahead of the national average of just under 5 percent.
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CHILTON FOOD GROUP

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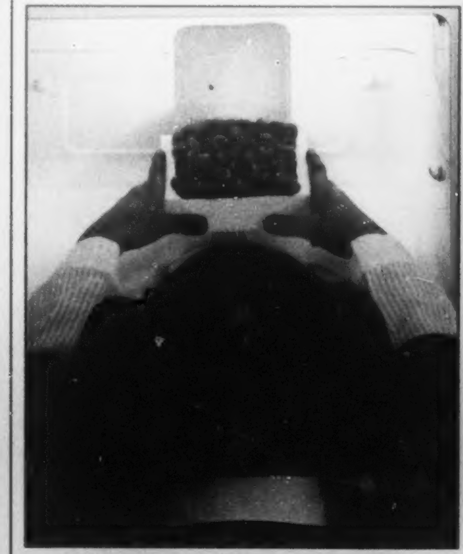

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SNACK FOOD
Once considered a caloric tide-me-over, snack food is now part of a day's feeding.
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CASH IS JUST PART OF THE PICTURE

They say that money isn't everything. After you read Food Engineering's annual Salary Survey, you'll see that they are right.

CHUCK HABERSTROH
Editor-in-Chief

Food company wages this year continued to move ahead. The Conference Board had predicted an average salary increase for exempt U.S. workers in 1988 of just under 5 percent. Food jobs ran at an average of 7.8 percent.

Predictably, optimism among food employees still outweighs pessimism.

But only by 14 points. We are not exactly looking at a tidal wave of confidence.

In fact, it is time for the food industry–particularly top management–to listen more seriously to what its people are saying about how things get done.

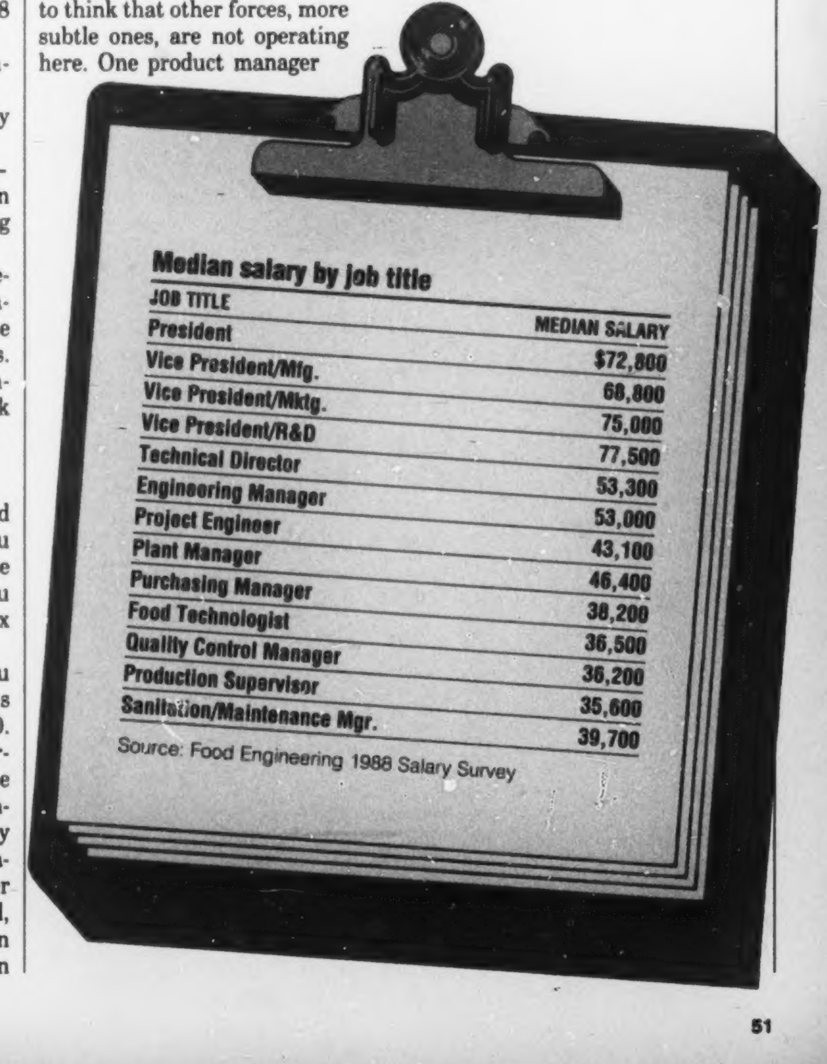
These conclusions are based on 1,800 responses we had to our latest salary questionnaire, which went out to over 10,000 people at food plants and headquarters locations. This was by far our largest and most comprehensive set of responses; and we think you'll be interested in some of the details.

Woman's place

The overall median salary for 1988 stood at $44,501 give or take a few cents. As you might imagine, there was quite a variance depending on who you were, where you were, what your title was, and still, what sex you were.

Let's take this last category first. If you were a woman, your median salary was $31,000. If you were a man, it was $47,000. The Department of Labor reports that, overall, women's salaries in the U.S. have climbed to 70 percent of male salaries. Unfortunately, the median in the food industry stands at only about 66 percent of male salaries. Partly that is because there are fewer women at the top of the salary pyramid, which in turn is partly the result of women being in the food industry fewer years than men (median for men is 15 years, for women it is 6–putting women at a major salary disadvantage).

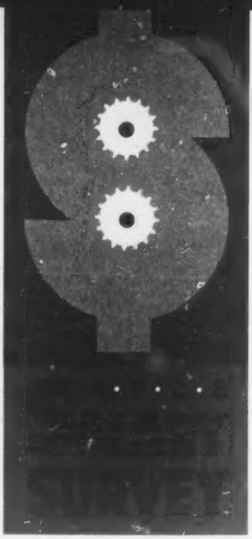
It would, of course, be naive to think that other forces, more subtle ones, are not operating here. One product manager



Median salary by job title

JOB TITLE	MEDIAN SALARY
President	$72,800
Vice President/Mfg.	68,800
Vice President/Mktg.	75,000
Vice President/R&D	77,500
Technical Director	53,300
Engineering Manager	53,000
Project Engineer	43,100
Plant Manager	46,400
Purchasing Manager	38,200
Food Technologist	36,500
Quality Control Manager	36,200
Production Supervisor	35,600
Sanitation/Maintenance Mgr.	39,700

Source: Food Engineering 1988 Salary Survey



notes, "Men with the same work experience and educational background and at the same level are making ten to fifteen percent more than women." "In this company, women are given equal jobs as the men...but salaries are often twenty-five to thirty-five percent or more lower, and no extras – golf outings, spouses going along to conventions, number of conventions limited," pointed out one purchasing manager. And according to a food technologist: "Females are definitely discriminated against. They are hired in with more education and experience for less money. As far as advancement – when a job goes up on the board with no degree required for a professional level, they are asking for a male. Any job requiring a degree is for a female and is classified at a lower level in respect to the responsibilities."

Who else got what?

Vice presidents of R&D had the highest median salaries – $77,500, noticeably more than presidents ($72,800), mainly because most presidents in the industry are still from smaller companies, while the opposite is true for R&D VPs. VPs of marketing were second in median salary ($75,000). Again, even though there was a broader distribution by company size than with the R&D chiefs, they came from larger companies.

Presidents did have the highest average percentage increases in salary (16.7 percent, compared to 9.1 for marketing VPs, 9.4 percent for plant managers, and 6.2 percent for production supervisors). However, if you were a president your chances of getting that increase were substantially lower than it was for others. For example, almost 83 percent of plant managers got increases, while only 45.6 percent of CEOs got them.

As noted above, second on the list of top-paid jobs was vice president of marketing. And if you look at our salary distribution chart you will see that the marketing end of the business is generally doing quite well (e.g., 31.2 percent of product managers make over $55,000 compared to 5.6 percent of food technologists and 6.7 percent of QC managers). And salary for the marketing people is not the whole ball of wax. As one sales manager noted, "Many salaries such as mine do not give a true picture of income – there are also commissions and other incentives to consider in the final, bottom line number." No wonder, as one respondent complained, "Many fellow employees have left technical research for sales work at other companies for more money."

This respondent, however, may not be seeing the big picture. Our salary distribution chart shows a whopping 71 percent of vice presidents of R&D making above $60,000 – a higher percentage than for VPs of either

Salary range by job function

	Under 25,000	25-29K	30-34K	35-39K	40-44K	45-49K	50-54K	55-59K	60-69K	70K or More
President	5.8%	3.9%	3.9%	3.9%	5.8%	11.7%	4.9%	1.0%	6.8%	51.5%
Vice President/Mfg.	3.8	1.3	1.3	3.8	6.4	3.8	9.0	5.1	16.7	47.4
Vice President/Mktg.	2.0	—	2.0	5.9	5.9	—	5.9	9.8	11.8	56.9
Vice President/R&D	—	—	3.2	—	3.2	3.2	9.7	9.7	12.9	58.1
Plant Manager	3.0	3.7	9.1	13.4	17.1	11.0	14.0	7.3	12.2	7.9
Production Supervisor	3.6	19.3	25.3	14.5	20.5	7.2	2.4	3.6	3.6	—
Engineering Manager	—	3.4	4.2	8.5	15.3	11.0	12.7	9.3	17.8	17.8
Project Engineer	—	4.9	11.0	18.4	25.2	14.1	12.9	3.7	8.6	1.2
Packaging Manager	2.4	4.9	2.4	9.8	12.2	12.2	22.0	17.1	9.8	7.3
Technical Director	3.5	3.5	7.9	9.6	9.6	8.8	10.5	5.3	14.0	27.2
QC Manager	10.1	17.4	17.4	19.5	14.8	9.4	4.0	3.4	2.0	1.3
Food Technologist	11.3	18.4	14.9	17.7	14.9	9.9	7.1	2.8	2.8	—
Chemist	16.0	16.0	16.0	20.0	6.0	10.0	10.0	--	2.0	4.0
Product Manager	—	9.4	9.4	15.6	12.5	6.3	15.6	3.1	15.6	12.5
Sanitation/Maint. Mgr.	9.4	5.7	17.0	18.9	17.0	17.0	9.4	1.9	3.8	—
Transport./Distr. Mgr.	12.1	3.0	18.2 —	21.2	—	21.2	9.1	3.0	12.1	—

Source: Food Engineering 1988 Salary Survey

Median salary by geographic region

GEOGRAPHIC REGION	MEDIAN SALARY
New England	$42,000
Mid-Atlantic	48,000
East North Central	44,000
West North Central	43,500
South Atlantic	42,100
East South Central	42,500
West South Central	42,500
Mountain	43,600
Pacific	45,500

Source: Food Engineering 1988 Salary Survey

manufacturing or marketing, and higher even than presidents. The problem may be educational access. Advanced education is a must. For example, 29 percent of our R&D VP respondents have a master's degree and 29 percent have a Ph.D. And while food technologists in the study had the requirements at the master's level (34.8 percent), only 7.8 percent had it at the Ph.D. level.

It seems also to be true, at least as far as salary goes, that bigger is better. The highest median salary by location size was for locations with 2,500 or more employees ($52,200). Also, the larger the location, the larger the percentage of employees who got raises. This is one area, anyway, where some of the consolidations that have taken place in the industry pay direct dividends.

Is everybody happy?

As in years past, we wanted to see if the basic nature of our respondents' jobs were changing, and also how they assessed their chances for advancement. Beyond the simple check-off answers, however, we were able to ask them to specifically comment on each of these matters. Some of the clusters of answers raised very clear issues.

First of all, 64 percent of all the respondents were looking at increased duties. And in many, many cases, the pattern was added responsibility coming from consolidations of one kind or another, like reduced staffs and merged operations – the panoply of effects of the lean/mean and merger/acquisition philosophies. This is a sample of what they had to say:

- "With upcoming announced plant closure, departees' duties have fallen to those who remain."
- "Two locations have consolidated. Processes are being moved from one location to another."
- "Cutback on supervisors – [I'm] now supervisor of three departments."
- "People retire and are not replaced."
- "Reduction in head count and increased emphasis on new products."

It was clear from the 1,700 comments that more than ever before pressure was on food company managers as much from contraction as from expansion – and often both at the same time. Under the best of circumstances there is too much to do. Take this technical director: "Increased staff/project load in R&D new product development, packaging and processing, QC/QA responsibility, additional contract packers for U.S.

Median salary by location size

NUMBER OF EMPLOYEES	MEDIAN SALARY
Under 20	$46,300
20-49	40,100
50-99	41,900
100-249	42,700
250-499	44,100
500-999	46,200
1000-2499	51,100
2500 or More	52,200

Source: Food Engineering 1988 Salary Survey

and Canadian markets, increased direct purchasing of fruit juice/drink concentrates, bases, others...." And under the circumstances of escalating consolidations or cutbacks things can begin to outstrip the manager who has to make them work: "I've gone from being responsible for production only to being responsible in addition for personnel, warehousing, packaging, and shipping."

The downside of consolidation is reflected in the almost 40 percent of respondents who said they were pessimistic about their chances for advancement. Again, one of the major clusters of comments had to do with shrinking opportunity because of shrinking size:

- "The company is downsizing on the corporate level."
- "Merger will eventually reduce personnel needs."
- "Continuing overhead reductions have taken their toll in available positions."
- "Manufacturing consolidations are closing plants as the company grows. Fewer opportunities."
- "Long term plans are to eliminate first line managers and let hourly personnel slowly take over responsibilities."

It must be noted, however, that among the almost 54 percent of respondents who were optimistic about their chances for advancement, one could occasionally see the other side of the coin – consolidation and increased responsibility creating increased visibility, and hence more chance for getting ahead. One technical director, for example, attributed his success to the "attrition of the senior members of the staff" and his own good track record.

Some of the other sources of pessimism among food company employees? One that kept rising to the surface was the discontent with the structure of family and other closely held businesses. Indeed, there was always a very clear line visible to our respondents as to where they left off and family or owners began. For example, there was the marketing VP who noted that he was at the "highest available" position in the company for him. Why? "Above is family," as he rather ominously put it. Other samples:

- "No improvement, because of family owned business."
- "Although most operations functions are controlled by me, decision making is closely held by the owners."
- And in the category of being thankful for small favors we have this response from a quality control manager: "Management turnover this year. The new president is the

Responsibilities and expectations

	MALE	FEMALE
Responsibilities (over the past year)		
Have Increased	61.5%	79.7%
Stayed the Same	33.7	16.9
Chances for advancement		
Optimistic	53.0	57.1
Pessimistic	38.7	37.5

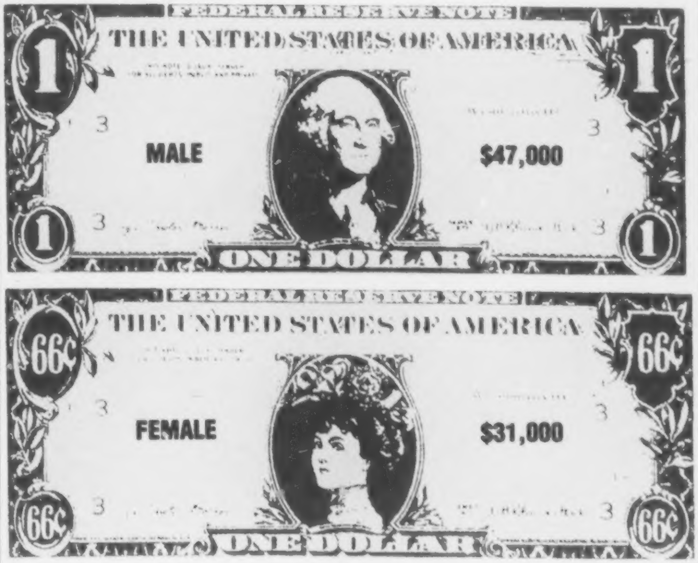
Source: Food Engineering 1988 Salary Survey

Job title by sex

JOB TITLE	MALE	FEMALE
President	94.2%	5.8%
VP/Manufacturing	96.2	2.6
VP/Marketing	98.0	2.0
VP/R&D	100.0	—
Product Manager	78.1	21.9
Plant Manager	96.3	3.7
Production Supervisor	92.8	7.2
Engineering Manager	96.6	3.4
Project Engineer	90.8	8.0
Purchasing Manager	81.5	18.5
Technical Director	88.6	11.4
QC Manager	71.8	28.2
Food Technologist	58.2	41.8

Source: Food Engineering 1988 Salary Survey

Median salary by sex



Source: Food Engineering 1988 Salary Survey

Foodnotes

from Eastman

Back to nature

Tocopherols are nature's fat-soluble antioxidants and exist in four forms: alpha-, beta-, gamma-, and delta-tocopherol. Alpha tocopherol (Vitamin E) is widely used as a nutritional supplement. Beta-tocopherols exist in concentrations too low to have any practical significance. Gamma- and delta-tocopherols are known primarily for their antioxidant properties and are widely used where customer preference requires the use of a natural antioxidant. More than 80% of the tocopherols in Tenox GT-2 are gamma- and delta-tocopherols.

If one needs an all natural antioxidant due to regulatory considerations or marketing strategy, Tenox GT-2 mixed tocopherols can prove extremely valuable in products containing tallow, lard, poultry fat or similar animal fats—as well as those of vegetable origin which may sometimes happen to be low in naturally occurring tocopherols. A glance at Table I will show you.

TABLE I

Fat	Tocopherol	Total Tocopherols (ppm)	AOM Stability* at 208°F (97.8°C)
Lard	none	—	7
	dl-alpha	200	33
	mixed	50	33
	mixed	100	45
	mixed	200	48
Tallow	none	—	7
	mixed	200	105
Butter Oil	none	—	35
	mixed	200	122

**hours to develop peroxide value of 20 meq/kg*

In most applications, addition levels of 0.015–0.045% of GT-2 are sufficient to promote stability, enhance palatability and protect sales appeal. When employed at these concentrations, it does not impart odor, flavor or color to fats, foods or food products. A word of caution is needed, however. Just because Tenox GT-2 mixed tocopherols exhibit very good activity, you should not be tempted to go overboard. At too high levels it can exert a *pro*-oxidant effect as you can see is the case for lemon terpenes in Table II.

TABLE II

Mixed Tocopherols (ppm)	AOM Stability*			
	Lemon Terpenes	Grapefruit Oil	Orange Oil	Lemon Oil
0	3	35	32	18
100	98	60	75	57
250	159	96	119	132
400	127	146	174	188

**hours @ 65°C to develop peroxide value of 70 meg/kg*

As gamma- and delta-tocopherols are not readily volatile at temperatures normally encountered in food processing and home cooking, carry-through of Tenox GT-2 antioxidant is excellent in sweet goods, snack products and other baked and fried foods. This is shown in Table III.

TABLE III

Mixed Tocopherols in Beef Tallow (ppm)	Schaal Oven Stability (145°F)*		
	Potato Chips	Pastry	Crackers
0	6	28	14
200	65	61	61

**days to develop rancid odor*

The antioxidant properties of Tenox GT-2 can be enhanced by adding acid synergists such as citric acid and ascorbic acid. These acids are mild antioxidants and metal-chelating agents. (Free metal ions are known to catalyze free radical oxidation of lipids.) Citric acid and ascorbic acid can be added to fats and oils in a propylene glycol solution or propylene glycol/water solution at levels of approximately 0.005%.

For more information on these products write to Suzanne Miller at
Eastman Chemical Products, Inc., a subsidiary of Eastman Kodak Company,
P.O. Box 431, Kingsport, TN 37662.

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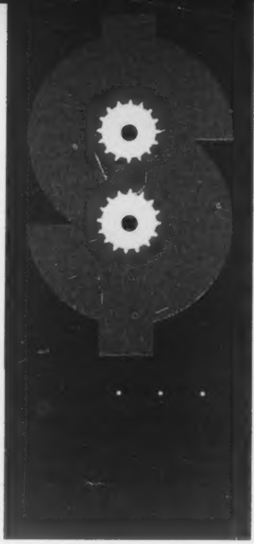

Salary shifts

("Increase" and "Decrease" refer to percentage of respondents whose salary showed some movement. "Mean Increase" is the percentage of actual individual salary increase.)

	Increase	Decrease	Mean Increase
SEX			
Male	83.0	1.5	7.7
Female	83.9	1.9	8.8
LOCATION SIZE			
Under 20	58.4	2.5	12.9
20-49	71.3	1.8	8.3
50-99	80.0	3.2	7.5
100-249	86.4	1.3	8.4
250-499	85.8	1.0	7.1
500-999	90.7	1.5	6.8
1000-2499	93.3	0.6	6.8
2500 or More	93.1	—	6.5

Source: Food Engineering 1988 Salary Survey

Median salary by industry

PRODUCT SPECIALTY	MEDIAN SALARY
Pasta	$50,500
Beverages	49,200
Seafood	49,600
Grain Milling	49,500
Dairy	43,600
Confectionery	43,100
Fats & Oils	49,400
Fruits & Vegetables	47,100
Bakery	46,300
Meat	44,000

Source: Food Engineering 1988 Salary Survey

founder's son. Started one week before I did. He listens better than the previous general manager."

One other area we probed was what respondents felt was the greatest obstacle keeping them from performing their jobs more effectively. We know that whatever one's salary and whatever one's attitude toward advancement, feeling effective in a job is a rock bottom consideration for job satisfaction.

I suppose that what we heard was not surprising: The largest single complaint had to do with the perceived quality of upper management. We might dismiss this by saying that people always complain most about their bosses. That is hard to say, however, when so many of our respondents are managers themselves, and very able to objectively evaluate difficulties. So, it would be good for senior managers to take note of what we heard.

There was also an accompanying theme running through the remarks about management: the need for better information and communication, whether among individuals, departments, and management levels, or simply in terms of a more articulated company business plan.

Some perspectives we got on what was causing performance roadblocks:

- "Lack of management support for installation of information and production automation systems."
- "[Lack of] access to information."
- "[Lack of] direction from upper management. Communication between management and all phases of the company."
- "Bureaucracy."
- "[Lack of] confidence in senior management."
- "[Lack of] a coordinated company vision and mission."
- "Company's organizational layout."
- "Lack of and/or poorly defined company goals. Inadequate long-range planning. Poor communications with upper management."

It is good to remember, however, that presidents can feel as hemmed in as those below them. Consider this response from one of the CEOs to the above question of the obstacle stopping him from performing his job more effectively: "Several problems here. A stagnant local economy, people working for you that really don't care about quality, suppliers that really don't care about you, customers that want high quality products but are not willing to pay for it."

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COVER STORY

In order to stay competitive, U.S. food companies are investing abroad. Photo by Arthur Myerson.

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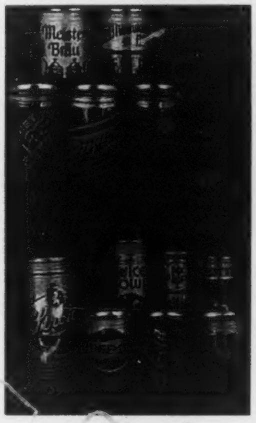

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GLASS, METAL AND PAPERBOARD PACKAGING
The "traditional" rigid container market is currently in a fight for its life.

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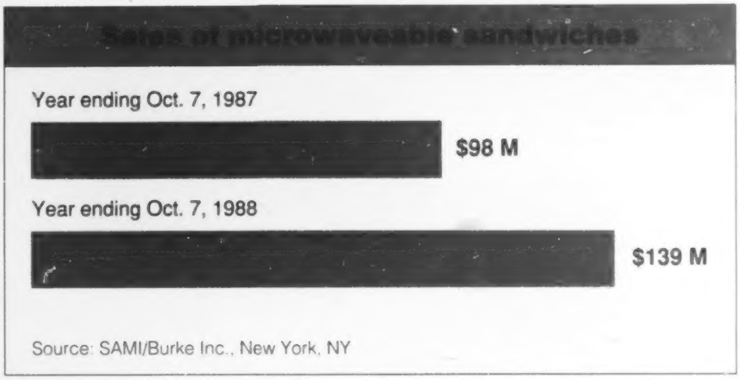
MARKETPLACE

Growth of microwaveable sandwich category lures new products



Source: SAMI/Burke Inc., New York, NY

As convenience foods and grazing become popular, sales of product such as microwaveable sandwiches are growing at a rapid rate.

A little over a year ago, the *Wall Street Journal* ran an article entitled, "Glamour of Upscale Frozen Foods Fades as Buyers Return to Basics." The article pointed out that while sales of premium frozen entrees were declining, cheaper and simpler frozen foods were making a come back. During the nine months after the article appeared, sales of frozen microwaveable sandwiches increased significantly. This category, which doesn't include breakfast sandwiches, reached $139 million in sales for the year ending October 7, 1988, reports SAMI/Burke Inc., a New York City-based marketing research firm. This was a 42.3 percent increased over the previous year.

The success of products such as J.R. Simplot's *MicroMagic* chicken sandwiches and hamburgers, Geo. A. Hormel's *New Traditions* microwaveable sandwiches and Campbell Soup's *Super Combo* line has lured more players into the arena.

Currently, Chicago-based Quaker Oats Company is test marketing *Old Town Oven Stuffs Microwaveable Deli Sandwiches* in Cleveland, Denver and Pittsburgh.

Another Chicago-based food manufacturer, Pitaria Products Co., introduced *Pita Stuffs*—a line of frozen, microwaveable pita-bread sandwiches—in the fall of 1988. Pita Stuffs come with four different fillings—gyros, ham and cheese, pizza or taco. A package of two retails for $2.59.

Mini Burgers, from Jimmy Dean Meat Company of Dallas, TX, is a new line of microwaveable, bite-size burgers with buns. These precooked burgers are made with 100 percent beef. They are refrigerated but can also be frozen.

Chicken sandwich also microwaveable

Tyson Foods, Inc., Springdale, AK, has added *Microwave Chicken Sandwiches* to its offerings. The 4.25 ounce chicken sandwich is coated with a southern fried breading and comes on a kaiser roll.

A 4.4 ounce offering contains two smaller mini sandwiches which have conventional buns. These sandwiches were formulated for microwave-only preparation. Shipments to retailers began September 1, 1988.

In homes, the microwave oven dominates the convenience food trend, according to a study on National Eating Trends (NET) offered by NPD, Park Ridge, IL. The study also points out that two-thirds of all households now use a microwave at least once every two weeks—an increase of about 10 percent over the previous year. In addition, the microwave has become the second most frequently used cooking appliance (after stove top), surpassing oven usage.

With more Americans turning to the "heat and run" method of food preparation, microwaveable sandwiches should continue to meet with success.

Salt-free hot sauce is new

Lang's Tangy Bang Sauce is an all natural hot sauce, formulated without salt. Available from Lang Naturals, Warwick, RI. this sauce contains: apple cider vinegar, honey, ginger puree, garlic juice, onion juice, carrot juice, horseradish, cayenne peppers, natural herbs and spices, natural flavors, and natural vegetable gum.

Tangy Bang Sauce is recommended for use with meats, poultry, pasta and seafoods. In addition this natural hot sauce can be used in soups, salads, stirfry dishes, Bloody Marys and a variety of other foods. A free recipe offer is included on the label. The suggested retail price for a 5-fluid ounce bottle is $2.59.

Wild lingonberry juice now offered in the U.S.

Nordia juices from Scandinavia are being imported to the U.S. *Wild lingonberry juice* has been available in gourmet shops, health food stores and Scandinavia shops for about eight months now.

Wild Lingonberry Juice has no preservatives, and only grape juice is added for sweetness. Lingonberries are grown in the forest of the northlands of Scandinavia. Several months ago, Natural Products of Scandinavia, Riverside, CT, also began importing *Black Current Juice*.

Ralston Purina adds four new P/L foods

Ralston Purina Company, St. Louis, MO, has launched four new private label products—*Bite-Size Snackers, Crackerdiles, Nutty Nuggets* and *Magic Stars*. Bite-Size Snackers are miniature size and are designed to compete with *Ritz Bits* crackers. Crackerdiles are crocodile shaped, bite-size crackers made with cheddar cheese.

Nutty Nuggets are made from wheat and barley and have no added sugar. To compete with popular children's cereals, Magic Stars are presweetened and contain colorful marshmallows. Each of the four new products has proven through consumer tests to be equal or superior to its brand name competitors, according to the manufacturer.

Coca-Cola
Coke
Coca-Cola
Coke
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Food Plants Abroad: U.S. Global Strategy

Foreign investment is the major strategy employed by U.S. food companies to boost international sales. Top competitive tool: the overseas plant.

Competitiveness is the current buzzword concerning America's role in the global marketplace.

Everyone agrees that we must improve our international competitiveness but nobody knows how to measure it. "Most equate competitiveness with trade," observed Dr. Charles R. Handy of USDA's Economic Research Service (ERS) at the annual meeting of the Food Distribution Research Society, October 24 in Houston. "But especially in food processing, one must look at the total foreign presence of U.S. firms in addition to international trade when evaluating competitiveness."

ERS is now studying the international operations of 57 major U.S. food processors whose 1986-87 sales were $147 billion, or 48 percent of all U.S. food processing sales. These 57 firms exported only $3.3 billion worth of products, or 2.8 percent of their total sales. But "export statistics, by themselves, greatly understate the foreign presence of U.S. food processors," said Handy. "Rather than rely on exports, it appears that large food processors use foreign investment as the major strategy for gaining sales in international markets."

As shown in the accompanying table, the 57 firms operate a total of 2,503 processing plants – 74 percent in the U.S. and 26 percent abroad. Thirty-six of the 57 companies own food processing plants in foreign countries. Sales from these foreign plants accounted for 20 percent of total processed

CHARLES E. MORRIS
Midwest Editor

Korea symbolizes the company's presence in 155 countries. Coke derives 65 percent of sales, and 77 percent of soft-drink operating income from foreign operations. (Photo: Arthur Myerson.)

U.S. and foreign food processing plants owned by U.S. food processing firms

Firms	Total plants	U.S.	Foreign	Percent foreign
	—— Number	——		Percent
CPC International	112	29	83	74
Ralston Purina	123	57	66	60
RJR/Nabisco	170	123	47	28
Kraft	96	52	44	46
Philip Morris (G.F.)	103	60	43	42
Heinz	63	25	38	60
Quaker Oats	65	31	34	52
Campbell Soup	87	59	28	32
Borden	153	127	26	17
Pepsico	115	91	24	21
ConAgra	150	127	23	15
International Multifoods	45	24	21	47
Sara Lee	67	47	20	30
McCormick	52	32	20	38
Coca Cola	63	48	15	24
Kellogg's	37	22	15	41
Pillsbury	77	63	14	18
Staley Continental	56	44	12	21
General Mills	47	35	12	26
Castle & Cooke	47	36	11	23
Wm. Wrigley	17	6	11	65
Archer Daniels Midland	122	113	9	8
Anheuser Busch	86	77	9	10
Hershey's	20	12	8	40
Procter & Gamble	23	16	7	30
IC Industries (Pet)	50	45	5	10
United Brands	25	20	5	20
Gerber Foods	6	4	2	33
Brown Forman	7	5	2	29
Curtice-Burns	29	27	2	7
Hormel	23	22	1	4
Wilson Foods	12	11	1	8
American Home Products	5	4	1	20
Flowers	35	34	1	3
Clorox	4	3	1	25
American Brands	14	13	1	7

Source: Company annual reports and form 10-K reports; USDA.

food sales for the 57 firms. Two companies – CPC International and Coca-Cola – generate more than 50 percent of their sales from foreign operations. Nine firms achieved between 30 and 50 percent of their sales from foreign subsidiaries, ten others between 15 and 29 percent.

Yet even sales from foreign subsidiaries understate the international presence of U.S. food processors, Handy continued. "Most U.S. food processors do not include licensing and joint-venture operations in reporting their foreign sales," Handy pointed out. "For example, many brewers – including Miller's and Coors – license Canadian firms to produce their brands in Canada." This avoids the costs of establishing foreign subsidiaries. U.S. food processors are also increasingly developing joint ventures, especially in socialist and communist countries where it's the only way to do business. Examples: Heinz and RJR Nabisco recently set-up joint food processing ventures in China.

Behind the trade barriers

Reasons why most of the companies studied prefer to produce abroad rather than export, said Handy:

- To avoid tariff and most non-tariff trade barriers.
- To reduce transportation costs, especially where consumer packaging adds weight.
- To ease relationships with foreign governments and compliance with local regulatory agencies. "U.S firms find it easier...when the product is produced in the host country."
- To keep abreast of local tastes and opportunities for new product development.
- To expand, using acquisition of established brands and manufacturing facilities as a base for expansion.
- To improve access to local marketing and distribution services.
- To expand a market developed through exports. Example: CPC International started-up a Chilean plant in 1986 to produce *Heilman* mayonnaise (and other products), formerly exported to that country but which had achieved market success to the point where it became more profitable to produce locally. "The paradox here is that the very success and growth of an export market led to its elimination," Handy observed. "This is another example of how foreign trade data can be a misleading measure of 'competitiveness.'"

However, it is still true that while large food processors are not major exporters, hundreds of smaller and medium-size processors have opportunities to identify and develop export markets for specialty products and to serve niche markets too small to attract the big guys, Handy continued. "Sun-Diamond Growers, Tri/Valley Growers, Welsh Foods, Smucker's and Thorn Apple Valley are examples of medium-size firms which have aggressively developed export markets," he pointed out.

Repositioning for '92

While the reasons for producing in foreign markets are largely marketing-related, big U.S. processors are aggressively trying to boost productivity in their foreign subsidiaries to become the low-cost producers in their host countries, Handy continued. "The scheduled removal of all internal trade barriers in the European Community in 1992 provides opportunities to obtain further economies of scale in European-based plants," he added.

U.S. food processors operating in Western Europe are already repositioning themselves for better access to the 320 million Common Market consumers by 1992. H. J. Heinz Chairman & CEO Dr. Anthony J. F. O'Reilly strongly hinted to shareholders at the company's annual meeting, September 7 in Pittsburgh, that Heinz might consolidate Western European production of certain products to gain manufacturing efficiencies when trade barriers fall. Last year, after Spain's entry into the EEC, Heinz acquired Orlando S.A. – a leading Spanish producer of tomato products, canned vegetables and fish – and Marie Elisabeth, a Portugese fish canner. Heinz also owns IDAL, a Lisbon-based tomato processor. "It is not inconceivable to think that in the mega-market of post-1992, all our ketchup in Europe could be sourced from one single location – perhaps Spain or Portugal," said O'Reilly. "It is not inconceivable that we will develop one single seafood location for the European market. It is not inconceivable that Heinz-U.K. – if it achieves revised production and cost targets – will become the major Heinz manufacturing location for recipe foods for all of Western Europe."

Coca-Cola, world champion among U.S. food/beverage processors with operations in 155 countries, is also repositioning for 1992. Foreign operations generate 65 percent of Coke's sales, 77 percent of soft drink operating income. "Recognizing that our organization does not determine how we deal with the world but that the world determines how we should organize ourselves," Chairman & CEO Roberto C. Goizueta announced on October 20 the reorganization of Coke's worldwide soft-drink structure into four operating groups from three, effective January 1. The newly-formed Coca-Cola EC Group consolidates operations in the 12-nation European Community under single management. A second new group, Northeast Europe/Africa (NEA), covers all non-EC European countries plus Africa and the Middle East. Countries managed by the Pacific Group and the Latin America Group remain unchanged.

International opportunities also influenced the recent $13.1-billion megamerger of Kraft with Philip Morris, which owns General Foods. As reported earlier in *Food Engineering* (November '88), international operations now account for 24 percent of sales and 25 percent of profits at Kraft; General Foods generates about 20 percent of its sales from operations abroad. "We believe the combination of Philip Morris and Kraft will create a U.S.-based food company that will compete more effectively in world food markets," said Philip Morris Chairman & CEO Hamish Maxwell in announcing the acquisition on October 30.

Pillsbury sources shrimp for its food-service operations and *Today's Catch* retail brand from the Far East and Latin America, including the Cachugan plant near Quayaquil, Ecuador (above). Shrimp are raised in a pollution-free environment, then harvested, procesed and frozen on the same day. (Photo: Pillsbury International Trading Group.)

Melvin (Mickey) Kupperman, president of A. Epstein & Sons International (Chicago) and a member of the National Research Council Committee on the Internationalization of U.S. Manufacturing, sums it up: "1992 will have a big impact on rationalizing the number of plants and distribution centers" in Western Europe, says Kupperman. It will allow processors to centralize production of food products which currently vary with national standards of identity and will continue to vary with ethnic tastes, boosting production efficiency. "I expect to see more consolidation of manufacturing," says Kupperman. David G. Owens, president of Owens Strategy Group, a Chicago firm specializing in strategic planning/implementation for food processors, concurs. Owens sees consolidation as "inevitable" though not immediate in every country.

Although existing trade barriers will come down within the EEC, there will still be various tariffs and barriers to U.S. imports, so one might expect a wave of U.S. investment to "jump over the barrier." But according to studies by Dr. John M. Connor, an agricultural economist at Purdue University, tar-

Foreign acquisitions/investments by U.S. food processors 1987*

U.S. Firm	Acquisition/ Investment	Country	Products(s)
Borden, Inc.	Kuntzle Group	W. Germany	Retail bakery chain
	Karl Jaus & Sohne	W. Germany	Bakery products
	Albadoro Spa	Italy	Pasta
	Paty S.A.	Brazil	Pasta
Button Industries	Bon Grain/Colombo	France	Yogurt
CPC International	Garrick Foods Ltd.	U.K.	Flavors, seasonings
	Nutrial S.A.	France	Breakfast foods
	San-Co. S.A.	Brazil	Corn starch products
	Sasoned	Colombia	Spices, colors
	Ubena Co.	W. Germany	Spices, herbs
Campbell Soup Co.	Beeck-Feinkost	W. Germany	Refrig./gourmet food
	S.A. Galettes de Pleyben	France	Cookies
Cargill	General Cocoa-Gerkens Group	Netherlands	Cocoa products
Coca-Cola Co.	Vancouver, B.C., unit of Coca-Cola Bottling Consolidated (N.C.)	Canada	Soft drinks
ConAgra	Kurt A. Becher Gmbh	W. Germany	Feed, grain
Church & Dwight	Volac, Ltd.	U.K.	Feed products
General Cinema	18% of Cadbury Schweppes	U.K.	Beverages
H.J. Heinz	Orlando S.A. (major interest)	Spain	Tomato products
	Pro Pastries	Canada	Bakery products
	Win-Chance Foods	Thailand	Baby foods
Hershey Foods Corp.	Nabisco Brands, Ltd.	Canada	Snacks, confections
IC Industries (Pet)	Facchin Foods, Ltd.	Canada	Pasta
Int'l. Multifoods	(Flour mill)	Venezuela	Corn flour
Pepsico, Inc.	Kentucky Fried, Ltd.	Canada	759 KFC outlets
Pillsbury Co.	Fraser Valley Foods Jim Pattison Group	Canada	Frzn., canned veg.; fish & chips; fruit
RJR Nabisco	InterBake Foods Ltd.	Canada	Cookies, crackers
	Iracema Ind. de Caju	Brazil	Cashews
Sara Lee Corp.	Food/consumer group of Akzo NV and Royal Dutch Shell	Netherlands	—
Paul Soulier	Union Enterprises	Canada	Frozen foods
Pilgrim's Pride	3 process plants	Mexico	Poultry
W.R. Grace Co.	S&W Berisford PLC	U.K.	Prepared foods

*For U.S. foreign acquisitions 1984-86, see *Food Engineering*, Jan., 1987

Source: The Food Institute

iffs are very little incentive to foreign investment.

William V. Janis, an economist who tracks the food processing industries at the U.S. Department of Commerce (DOC), agrees and doesn't see any big scramble to Europe by firms not already operating there. "What's the universe of U.S. food processors who are likely candidates for first-time investment in Western Europe?" Janis asks. "The wave of big mergers and acquisitions here has eliminated most potential candidates."

Global opportunities

What spurs U.S. food processors to invest abroad? Sources queried by *Food Engineering* cite several factors:

1.) The mature U.S. market and perceived market opportunities abroad. Says USDA's Chuck Handy: "You either have to take market share from competition here, expand in

Foreign investment in U.S. food industry surpassed U.S. investment in the food industry abroad in 1984 and by 1987 exceeded U.S. investment abroad by $3.36 billion. But U.S. firms earned a far better return on their overseas investments, generating 1987 income of $2.78 billion vs. $878 million for foreign companies operating here. Even after deducting capital gains due to currency translations, income for U.S. firms in 1987 totaled $1.96 billion. (Source: U.S. Dept. of Commerce)

U.S. investment in foreign food industry versus foreign investment in U.S. food industry
(Millions of dollars)

United States:	1983	1984	1985	1986	1987
Direct investment position:	7,661	8,156	9,252	10,968	12,643
Capital outflow:	25	478	1,196	1,469	1,630
Income:	676	683	1,619	2,091	2,784

Foreign:	1983	1984	1985	1986	1987
Direct investment position:	7,447	8,270	10,710	12,147	16,004
Capital outflow:	798	818	2,538	1,337	3,832
Income:	553	726	441	797	878

Source: U.S. Dept. of Commerce

Stefansbäck
der frische Bäcker

International operations of Borden Co., which acquired 58 companies here and abroad since early '86, include the 59-store Stefansback retail bakery chain operated by the Kuntzle Group in West Germany. (Photo: Borden, Inc.)

another product area, or expand abroad." The population growth in the United States is only 1-2 percent per year, notes Purdue's John Connor, who produced the recent report *Food Processing: An Industrial Powerhouse In Transition* for the Institute of Food Technologists. Newly-industrialized countries such as Brazil, Mexico, Nigeria and those on the Pacific Rim have fast-growing middle classes looking for convenience foods to replace scarce kitchen labor. "One sure measure of national development is when you can't get a maid any longer," says Connor.

2.) To diversify assets and therefore spread risk, "like managing an investment portfolio," says Connor. This includes diversifying risks in currency translations.

3.) To diversify raw-material sources. "If you were getting vegetables from Wisconsin during the summer of '88 you were in trouble," notes Jeff P. Muchow, vice president of Food System Associates, a Washington, D.C. management consultant to food processors. Companies such as Campbell Soup, Pillsbury and General Foods have invested in South and Central American farms and food plants to take advantage of lower labor and raw-material costs. Pillsbury, for example, sources shrimp for both its food-service operations and *Today's Catch* retail brand from Taiwan and Ecuador. "Expanding our operation to supply others outside the Pillsbury group represents a good business opportunity," says David Mesley, director of imports for Pillsbury's International Trading Group.

4.) Competitive advantages. "Foreign markets are less competitive," observes DOC's Bill Janis, ranking English-speaking markets such as Canada and Australia as most competitive for U.S. products to Pacific Rim markets as least competitive. This offers American food processors greater returns from their marketing expertise. Foreign customers want well-advertised brand names and convenience foods "even in China," adds James F. Azumano, president of the international food consulting firm K-Pac International in Eugene, OR. But cultural influences will determine what's going to sell, he cautions.

5.) Enlightened governments, more receptive today to partnerships with private firms to create jobs and gain access to Western technology. But cheap labor isn't a major motive for food processors to locate abroad, says Muchow: Automated food plants don't use much labor.

6.) Improving economies and political stability in the Third World, coupled with declining world tensions. Nationalization of industry has been rare, John Connor points out, occurring mainly in Cuba and in the East Bloc after WWII. Industries that have been nationalized tend to be raw-material industries such as petroleum, mining and agriculture, not manufacturing.

7.) Pressure from foreign competition, says Mickey Kupperman of Epstein, noting for example that Britain's Marks & Spencer – renowned for its high-quality fresh and prepared foods – is entering the U.S. market. "There's a growing awareness of the global economy, from the standpoints of price, new technology and product quality – an *overwhelming* focus on quality."

Six basic strategies

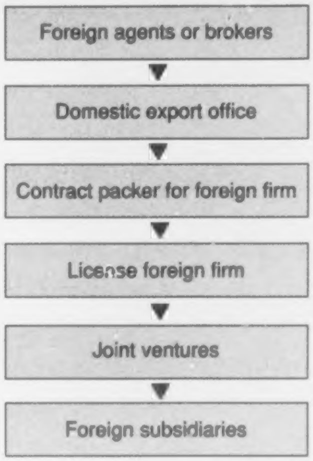
Food firms can apply several alternative strategies to enter foreign markets, said USDA's Chuck Handy at the Houston conference. He ranked six basic strategies according to degree of investment required. The first three relate mainly to exports, the final three to direct investment.

Most firms enter the export market for the first time through *foreign agents or brokers*, Handy explained. As export sales increase, they can set up an *export office or export division* within their U.S. company. Another route could be to *contract production* to a foreign packer, much as they would employ a co-packer in the domestic market.

Although *licensing* requires no direct investment in production facilities, considerable investment is needed to identify possible licensees, develop production and marketing procedures and establish quality controls, said Handy.

Joint ventures allow the American firm to tap into the production, marketing and regulatory know-how of a host-country firm at less cost than acquiring a wholly-owned subsidiary. Finally, a U.S. processor can acquire or build foreign production facilities and operate them as a *wholly-owned subsidiary*. "In actual practice, a firm can use any one or all of these strategies at the same time," said Handy. But the major strategy employed by large U.S. firms is to acquire a regional processor who commands number one or number two market share for his product and build from there, Handy told *FE*.

Alternative strategies to access foreign markets



Source: USDA.

Planning the project

Factors to consider in the feasibility study for an overseas-plant project, says Kupperman: trade restrictions; product standards and regulatory standards; work rules ("it's more difficult to fire people in foreign countries, for example"); social benefits; planning approvals; environmental issues ("which take on a new dimension in Europe"); raw-material sourcing; distribution costs; energy costs ("higher in Europe"); taxes; solid-waste disposal; land costs ("high in Europe"); construction costs, ("difficult to predict"); and import restrictions (which in Latin America, for example, can limit implementation of new technology).

You generally don't have much choice in selecting a plant site overseas, says Robert L. Opila, who has managed food plant projects in 28 countries as food group manager for The Austin Co. (Des Plaines, IL). "You're told where to build," says Opila. "Foreign nations have more central planning, not just in the socialist countries but elsewhere in Europe, Asia and Latin America." Labor intensity is a virtue in socialist states. But on a meat plant project in Yugoslavia, Opila recalls, "we were told: 1.) Where to build; 2.) How many people the plant would employ; 3.)That it would process pork. In that order."

Key to planning the foreign project, Opila advises: Determine import restrictions early and find out what you can't do locally. Example: the Heinz baby-food plant at Guangzhou, China, which started-up in 1986. All imports had to be listed – even down to fasteners – so Chinese officials could determine if anything could be supplied locally. Only one stainless-steel fabricator could be located in all of China, at a great distance from the site, so all stainless was fabricated here and exported. "We sent over a giant erector set," Opila recalls. Power availability is a problem in every country, says Opila, so the utility infrastucture must be evaluated early as well. Third World na-

[illegible]

$1 billion or more (10 firms)

Philip Morris (G.F.)
Coca Cola
CPC International
RJR Nabisco
Kraft
Heinz
Sara Lee
United Brands
Kellogg's
Quaker Oats

$500 million or more (7 firms)

Pepsico
Ralston Purina
Castle & Cooke
Campbell Soup
Hershey's
Pillsbury
Borden

Sources: Company annual reports, supplemented by data supplied by individual companies, USDA

tions frequently don't want the latest U.S. process controls but "the technology of the '50s and '60s," Opila observes, "what we would consider antiquated." Labor quality varies widely, as does the quality of local contractors, says Oplia, who rates contractors from generally "good" in Europe to "fair" in Latin America, "a disaster" in China and "impossible" in India. "Even the best European contractors would be only average in the U.S.," he added. Rule of thumb for the foreign project, says Opila: "Don't assume anything. Check into everything."

Johnny W. Gibson, director of international food projects for Fluor Daniel (Greenville, SC), has managed several Chinese food-plant projects and cites communications as a key problem. Gibson's solution: Chinese-American supervisors who speak the language. Gibson concurs on the importance of defining what materials and equipment can be supplied locally, what must be imported. "The joint-venture partner should supply what he can," says Gibson. "Most process equipment is U.S. technology and must be imported, as well as anything unique such as stainless steel piping and valves. Some refrigeration, air-conditioning and electrical equipment can be supplied locally, and the quality is OK." Drawings must be completely detailed, "even down to cove moldings." Construction brigades require close supervision on site, and plant operators need a lot of training, especially in automation devices such as PLCs. "It's not cheaper to build a plant in China," says Gibson. "Labor is cheaper, but you have higher management and transportation costs, including the cost of transporting your own people. Capital investment is no less than it is in the U.S. So you must justify a project in China on a business basis, not a cost basis. But patience, persistence and training will pay off."

Middle Eastern governments – especially Saudi Arabia – also want you to purchase construction materials locally, reports Lenny Bruce, project manager at the Atlanta office of Lockwood Greene Engineers. "You must justify to local authorities whatever you have to import," says Bruce. Result: "You build mainly of concrete. But concrete and hot weather don't work well together, so you have to be sensitive to this." Dust in the desert "is like talc," he adds, so air-filtration systems are critical to food-plant design. Water is scarce, so plants must be designed to minimize water for processing, sanitizing and washdown. Saudi contractors hire a lot of Third World labor who all generally speak English but precise communications are important. Engineering drawings must be more detailed than for a U.S. project, Bruce adds, but local engineers will re-work your drawings and re-submit them for approval.

The plant as competitive strategy

Successful companies in today's global marketplace "are those who can stay agile, who can marry technology to marketing skills to stay on the leading edge," says Mickey Kupperman of Epstein. "Once this meant companies able to cope with change, but survival now means those who *thrive* on change. Product life cycles can be very short."

Kupperman wonders if the recent wave of giant mergers and acquisitions will create companies more agile or more sluggish. "It gives them more resources, certainly," he observes. "With a light touch on the wheel, they can create opportunities." The ideal: "A lean, hungry, strong competitor with deep pockets."

Because the companies who survive will thrive on uncertainty, "the plants we design should be 'how-should-I-know?' plants – flexible and designed for what we can foresee, yes, but with the ability to bring new products to market quickly, efficiently and of high quality.

"We're getting away from designing buildings," Kupperman concludes. "We're now designing competitive tools – we're designing plants as competitive strategies."

Special Emphasis

GLASS/METAL/PAPERBOARD

FACING AN UPHILL BATTLE

Once the backbone of most food packaging, glass, metal, and paperboard containers are facing constant erosion from the plastic sector. The containers should survive the erosion but the fight will be difficult.

Are the old standbys of packaging – glass, metal, and paperboard – facing death and destruction? Why the question you ask? Because right now, the "traditional" rigid container market is in a fight for its life. The main predator of these markets has been the plastics industry. There is no doubt that glass, metal, and paperboard are in a survival game in today's packaging market.

For openers, take a look at glass. This segment is being hit hard by plastics. Even now, plastic has invaded the glass industry's long standing territory in several consumer food areas. Procter & Gamble's *Jif* peanut butter is currently being marketed in PET jars, as well as *Folger's* instant coffee. Market gurus estimate that PET containers account for approximately 15 percent of the container market previously supplied by glass.

With the relentless attack by plastic on glass and metal, one has to wonder why these packaging forms are still being used. There are several reasons, but the emphasis usually is cost and consumer preference. Glass has been preferred by consumers over many years. It is clear and lets you "see" a food product before it is purchased. It has usually been economical to both consumers and manufacturers. And sometimes there is just no replacement for a container that can withstand heat and retorting.

Metal cans, too, have been around for a long time for many of the same reasons. Cans provide economical packaging for manufacturers and relatively long shelf lives for products. With new advances in steel plating, cans are becoming lighter in weight and more easily transported as well. One bonus of the metal industry is that manufacturers never had to worry about the addition of tamper-evident seals: The metal can provides its own.

MARGIE J. RUSSELL
Technical Editor

Another "traditional" packaging container, paperboard, is also familiar to consumers and has turned into somewhat of a workhorse for the dual ovenable sector. Thanks to the microwave, paperboard is enjoying

This photo shows the manufacture of glass on a production line. (Source: Glass Packaging Institute.)

new life since it became the answer to a manufacturer's problem on how to package a product for both the conventional oven and the microwave. The dual ovenable market has enjoyed great success due to the inherent properties of the paperboard container.

Glass under selge?

How tough is the survival game going to be for traditional packaging materials? Pretty tough according to industry spokesmen.

According to the U.S. Department of Commerce, the glass industry is expected to grow at an average constant-dollar rate of three percent annually during the 1988-93 period. For 1988, the agency forecasts an increase to 162 million gross units of glass shipments for food and beverage containers.

Overall, the end-use markets for glass will become more concentrated because of declines in the general packaging sector. Glass packaging in specific end-use markets will be limited to products that require a container with the traditional properties of glass: image, visibility of the product and high moisture and oxygen barriers. Some of these products, industry sources and manufacturers claim, will remain in glass for a long time, according to Edward Schollmeyer, Paine Webber Inc., New York, NY.

For example, mayonnaise is a product that historically has always been packed in glass. Glass, for this product, provides all the properties a manufacturer requires: clarity, economy, and consumer preference. Several companies have studied the possibility of a conversion to plastic for mayonnaise products but felt that plastic just would not do the job.

Baby food and juice products are another category of products which retain glass as the container of choice by a large margin. Glass is a cost-effective container in this industry. A changeover might mean substantial losses: Many plastic containers cost twice as much as identical glass ones.

Studies show that wine is sold almost exclusively in glass bottles. The glass industry is also at the mercy of the product since a large majority of wines are packed in green bottles. A plastic bottle providing the long shelf life needed by wines is not yet available but there are some plastic bottles which can provide average barrier properties for quick-moving products. Interestingly enough, wine coolers represent a major end-use mar-

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The resurgence and promise of glass

Customers and consumers have come home to glass packaging. The glass container industry has seen a resurgence in recent years. The reasons are many, but much of the growth can be attributed to environmental concerns, the increasing use of microwave ovens, and lighter and more durable glass containers.

Traditionally, food packaging engineers and processors follow a multi-dimensional approach to packaging decisions. Factors such as product development, manufacturing, and marketing are never far from the minds of engineers. But until recently, the focus has been the "pre-consumer" phase of a product's life. "Post-consumer" thinking extended only as far as the nearest landfill. Our "throw-away" society demanded disposability, and industry responded.

The eighties decade, however, has ushered in an entirely new sensibility. Environmental concerns are leading to increasing public demand for recyclable packaging. As a result, packaging professionals are looking more closely than ever at the post-consumer end of the packaging spectrum.

With the dawn of our national solid waste crisis, Americans are discovering the limits of landfilling and incineration. Regulation and citizen opposition make both of these options problematic. The remaining leg of the solid waste management triad – recycling – is gaining general acceptance as the preferred first line of attack in the war on solid waste.

Recycling, of course, is not a new practice. The glass industry, for one, has supported recycling efforts for several years. The growing garbage crisis, however, has spurred on this renaissance of recycling in two critical ways. Both deserve notice – and respect.

- Recycling and public policy.

Government, at every level, is getting involved. Almost half of all states in the U.S. enacted some form of solid waste legislation in 1988. Several of these state laws establish comprehensive solid waste management plans and goal-oriented recycling programs. Five states now mandate source separation of recyclable materials (such as glass, aluminum and newspapers) from household garbage. More than 600 U.S. communities have curbside collection and recycling programs in place. Meanwhile, legislatures in 33 states considered restrictions on certain non-recyclable packaging during the past year.

At the federal level, the U.S. Environmental Protection Agency recently set a national target of reducing the solid waste stream by 25 percent through recycling.

- Recycling and public opinion.

A recent Gallup poll commissioned by the Glass Packaging Institute found that Americans are willing and ready to help recycling efforts. In fact, more than 50 percent of those polled said they would change their purchasing habits to buy foods and beverages ket for glass and appear to be one of the fastest growing beverage products in the U.S.

The glass sector has also been affected by the number of mergers and buy-outs in the packaging industry. Anchor Glass acquired Midland Glass and recently merged with Diamond-Bathurst creating outstanding debt. Owens-Illinois acquired Brockway Inc. and increased its debt as well.

What does all this mean to the packaging industry? It undoubtedly points to higher prices for glass containers, the only viable way the merging companies can cope with their debt. But, pressure will come from manufacturers to keep glass prices competitive. If glass prices rise too much, processors may be forced to look at other options, namely plastics.

Yet, the glass industry is emphasizing lighter products and a variety of shapes for its containers. Owens-Illinois, Inc., which merged with Brockway, Inc. and is now doing business as Owens-Brockway, Toledo, OH, offers its line of products for glass packaging. The company thinks that glass provides a quality image, consumers prefer it over other types of packaging, and consumers like the easy opening features of glass.

The company has several lines of glass containers available for the industry including a line of glass for the single-serve juice market. This appears to be a fairly rapid-growth market and glass containers provide visibility and recloseability. The single service glass bottles are available in a variety of sizes: 16 ounce, 10 ounce, eight ounce, and six ounce.

Val-U-Coat bleached paperboard from International Paper supplies the packaging for California Pizza, a line of gourmet frozen pizza from the Wolfgang Puck Food Company. (Source: International Paper.)

CALIFORNIA·PIZZA
CALIFORNIA PIZZA
CALIFORNIA·PIZZA
SPICY CHICKEN
SAUSAGE & HERBS
SPAGO'S ORIGINAL

seems to be direct correlation between a package's recyclability and its desirability in the eyes of consumers—a correlation that should become more pronounced in the future.

The importance of this statistic becomes apparent when compared to another study conducted by the Food Marketing Institute. According to the FMI poll, more than half the supermarket buyers surveyed said they use customer feedback in their new product buying criteria. Consumers who support recycling are growing in number and volume.

When consumers look for recyclable containers, they choose glass frequently. The Gallup poll found that 73 percent of survey participants knew already that glass is 100 percent recyclable. Recycling-conscious consumers translate into added marketing strength for glass packaging.

Another area of market growth for glass is in the microwave category. More than 43 million times each day, Americans turn on their microwave ovens to prepare everything from snacks and entrees to sauces and desserts. Estimates are that more than 90 percent of American households will include a microwave by the year 2000.

One recent study by National Family Opinion found that consumers prefer glass over all other microwaveable packaging. Glass is perfect for the microwave. Among its advantages:

- Heat and serve convenience—consumers can heat, serve, reseal, and reheat their food product in a glass container.
- Microwave compatibility—glass is "microwave-friendly." It does not react chemically with or change the taste of food during the cooking process.
- Clarity—glass allows customers to view the product before, during, and after the cooking process.
- Premium image—the reputation enjoyed by glass packaging makes it even more attractive to the upscale consumer of convenience food products.

The glass industry has worked to support the innate marketing qualities of glass with some exciting innovations. Production techniques, such as those which led to lighter weight, more durable designs, and new product shapes are key to the success of glass packaging. Refinements in press-and-blow technology have enabled wide-mouth and narrow-neck containers to better meet the needs of today's food and beverage customers.

Together, the growing influence of recycling, microwave cooking, and new designs and production techniques add up to a promising future for glass packaging.

Lewis D. Andrews, Jr. is president of The Glass Packaging Institute, a Washington, D.C. based trade association representing the glass container industry. The industry supports numerous programs and activities to promote recycling in 22 states and the District of Columbia.

Trends and forecasts: sanitary food containers
(in millions of dollars except as noted)

					Percent Change				
					Compound Annual		Annual		
Item	1985	1986[1]	1987[2]	1988[3]	1972-85	1980-85	1985-86	1986-87	1987-88
Product data									
Value of shipments[4]	2,853	3,013	3,222	—	5.7	3.6	5.6	6.9	—
Value of shipments (1982$)	2,621	2,700	2,754	2,809	-1.9	-1.7	3.0	2.0	2.0
Shipments price index[5] (1982=100)	109.1	111.8	117.2	—	7.7	5.4	2.5	4.8	—
Trade Data									
Value of imports (ITA)[6]	13.3	13.4	17.7	21.2	—	18.9	0.8	32.1	19.8
Import new supply ratio[7]	0.005	0.004	0.005	—	—	20.1	-20.0	25.0	—
Value of exports	48.4	37.4	46.0	55.5	10.4	-5.4	-22.7	23.0	20.7
Export shipments ratio	0.017	0.012	0.014	—	4.2	-8.8	-29.4	16.7	—

[1] Estimated except for exports and imports.
[2] Estimated.
[3] Forecast.
[4] Value of products classified in the Sanitary Food Containers industry produced by all industries.
[5] Developed by the Office of Industry Assessment, ITA.
[6] Import data are developed by the chapter author.
[7] New supply is the sum of product shipments plus imports.

Source: U.S. Department of Commerce, U.S. Industrial Outlook, 1988.

These statistics represent trends and forecasts for the sanitary food container sector of the food packaging industry. (Source: U.S. Industrial Outlook, 1988.)

The metal market

The metal can market appears to be holding its own in fighting for a share of the container industry. As reported in *FE's Packaging Status Update* (Oct. '88), the steel can appears to be enjoying a resurgence. Steel cans remain an option for packagers when prices of other types of containers rise. And steel manufacturing has improved so much over the years that the consumer is receiving a better, lighter-weight can. More importantly, cost reductions in steel cans have never shown a reduction in performance.

Like the glass container industry, the metal can industry is expected to grow an average annual rate of three percent, measured in constant dollars during the 1988-93 period, according to the U.S. Department of Commerce. This growth figure is affected by demands in the major end-use markets for metal cans: beer, soft drinks, and food packaging.

An increase in soft drink consumption is seen as one of the main growth end-use markets for metal cans. Consumption increases are seen as part of the diet consciousness of the consumer who will drive up sales of diet sodas significantly. In an interesting strategy by the beverage companies, soda is also being marketed as a breakfast beverage as well. And, lite beer consumption is also predicted to increase as part of the diet trend.

Juice and food packaging as other end-use markets of metal cans will see increases as providing convenience products to consumers. Can packagers will be emphasizing the single-serving serving trend as well as providing products for the health conscious: low fat, low salt, low cholesterol.

Aluminum has shown excellent growth over the last 10 years and is expected to grow moderately into the next decade. The main end-use markets for aluminum are of course beverages—which will continue to rise in consumption—juices, and some baby foods. The aluminum sector's growth will also be spurred on when the market finally reaps the benefits of its recycling efforts over the past few years. Interestingly enough, plastics do not threaten the aluminum market as much as steel because plastics deal with many multi-purpose markets which aluminum does not serve.

Reynolds Metals Company, Richmond, VA, a major aluminum can manufacturer, predicts continued strong growth for this market into the next decade. Shipments of the drawn-and-ironed aluminum beverage can are expected to show continued growth during the package's 25th anniversary year. The drawn-and-ironed can revolutionized the beverage can industry due to its light weight, line speed efficiencies, and environmental soundness.

Reynolds Metals also emphasizes the structural integrity of its products. The company feels that much technology is going on behind the can such as continuous lightweighting. These improvements are often never seen by the consumer.

Aluminum beverage can shipments are predicted to reach 79 billion units in 1988,

Schlitz
PEPSI
Coke
NEHI
SPARKLING WATER
Meister Bräu
Hamm's
Royal Crown Cola

The drawn-and-ironed aluminum beverage can has undergone significant design changes from the first cans of the 1960s through the modern cans of the 1980s. (Source: Reynolds Metals Company.)

an increase of more than six percent over the previous year. The company also reports that the drawn-and-ironed aluminum can held a 96 percent share of the canned beer and soft drink market in 1988.

The paper category

If the market conditions of the glass and metal packaging sectors seem relatively stable, things may not be so rosy for the paperboard sector. Currently, tonnage of paperboard is flat and spot shortages are evident. Paperboard prices are the highest in history in the U.S. Because of the weak dollar and high export rates, almost 15 percent of all paperboard shipments are presently going overseas.

Shipments of sanitary food containers, composed mainly of paperboard, are projected to climb at an annual rate of about 2.2 percent, reports the U.S. Department of Commerce. Major end markets for these containers are paperboard milk cartons, aseptic food containers, ovenable paperboard trays and containers, and other types of containers for liquid or oily foods.

Paperboard is now regaining some of its market share that was lost to other packaging forms. One major end-use market is aseptic packaging which has been targeted for dramatic growth in the next decade. The fastest growing segment of this industry is non-refrigerated fruit juices which sold two billion units in 1987 (*FE* Oct. '88).

Without question, paperboard has a bright future in the dual ovenable container market. It provides cooking options to the consumer that no other container can. In addition, container cooking is so important to the paperboard market that this sector might cut into the metal can market. Container cooking is just not possible in a metal can which gives a good advantage to paperboard. The push for fresh packaged foods will probably increase, too, and in all likelihood this spells another growth area for paperboard use.

Keeping in mind the dual ovenable marketing approach for paperboard, take a look at some of the more familiar products that this industry offers. The Ovenable Products Group of Westvaco, Richmond, VA markets a tray-and-lid design product which eliminates outer cartons. The Westvaco Ovenware system can be marketed for a specific product with up to seven colors for superior graphics. A new, on-press finish coat which has the sheen and glow of off-press laminations is now available. A few famous applications of this ovenware are *Stokely's Singles*, *The Budget Gourmet*, and the newest line of *Elegant Entrees*.

Conclusions

Predicting the future for the glass, metal, and paperboard markets is difficult. Economic trends will affect these markets as the amount of disposable income increases and decreases. Demographics will also play a part. Forecasters see a lower growth rate for the population but working women, singles, and single parents will all be growth categories. And, the emphasis on diets and health consciousness will only get bigger.

Will these packaging categories be able to meet the challenge of new product developments? These markets seem to think so. For example, the glass industry will continue to stress the microwaveability of their containers. The aluminum market feels it fills market demands that plastic cannot. The aluminum industry stresses a single-serve market, while plastic stresses multi-serve ones. There is aggressive expansion going on as the aluminum industry is introducing cans for other products besides soft drinks. This sector feels there is a huge potential in the juice market.

The most significant trend to affect the future of these markets has nothing to do with lifestyles or incomes. It has to do with recycling. Industry analysts predict that in the next five years, mandatory recycling will come of age and the result will be an important one: Consumers and the industry will take an entirely different view of the rigid container markets and what they mean to food packaging. If the recycling process maintains a closed system, then the process can attain maximum efficiency and thus assure the rigid container market a reasonably healthy future.

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THE U.S.S.R.: HITTING THE HOME RUN

The Soviet food industry seems on the verge of a new revolution. Perestroika will open it more than ever before to Western-style change. But working with the great bear has never been easy.

Last August, Jan Bone, a free-lance technical writer, visited plants in the Soviet Union as part of a People-to-People food processing and packaging delegation hosted by Centrosoyuz, the Central Union of Consumer Cooperative Societies. The delegation was led by Walter L. Clark III, Chapman College professor of food science and former president of the Institute of Food Technologists. This is what Jan Bone observed in the course of her travels:

When you're dealing with the Soviets, everything seems to come out to be "Yes, but...."

That is because many things are changing rapidly. Just as important, however, is the fact that the cultural and business assumptions an American unconsciously makes often become a barrier to understanding what he or she is seeing.

And so, I found myself somewhat perplexed in Kiev last August.

My notes, taken two weeks previously during the seminar at Centrosoyuz' Moscow headquarters, were uncompromisingly specific: "Centrosoyuz has 22,000 enterprises," the interpreter had explained. "Centrosoyuz employs over 3 million people. Centrosoyuz produces 35 percent of the bread made in the entire Soviet Union, 26 percent of beverages, 16 percent of the canned food, and 15 percent of Soviet confectionery products."

Forty years' experience as a journalist told me I had written down exactly what I'd heard.

But when I further questioned the interpreter two weeks later—weeks in which I'd toured two Centrosoyuz cooperative sausage plants, one bakery, one juice factory, one cannery, one state agro-industrial complex, one confectionery factory under construction, five cooperative retail stores and an agricultural market—it became apparent that despite all the facts I had accumulated in the six cities we'd visited, I hadn't *understood* the Soviet food processing system at all.

I realized then that at the original seminar the Soviets hadn't explained "cooperatives." They didn't feel they had to. They thought I knew.

For example, while Centrosoyuz, whose main emphasis is trade, *does* indeed have 20,000 establishments, it doesn't own them, in the way Americans think of General Motors owning factories. Instead, its food-producing plants and retail stores are owned by the shareholders of various cooperatives.

And Centrosoyuz *does* employ 3.5 million Soviets—but not, as I learned, in the American sense of work for hire. Women stuffing sausage casings in the factory at Podol'sk (sic), near Moscow, aren't Centrosoyuz employees. Instead, they are shareholders in the cooperative who have chosen to work in the food processing plant which this particular cooperative owns and operates.

I discovered that in the U.S.S.R. it is easy to find yourself with notebooks crammed with observations but with few answers. I also discovered that even when you think definitions are clarified, agreed upon, and out of the way—a mandatory first step in dealing with the Soviets—that they may still not be. Hence, the climate of "Yes, but...."

I'm not alone, apparently.

Fritz Friday (Friday Canning Corporation), chairman of the executive committee of the National Food Processors Association (NFPA), says, "It's extremely difficult for Americans and American companies to find out what the Soviets really need."

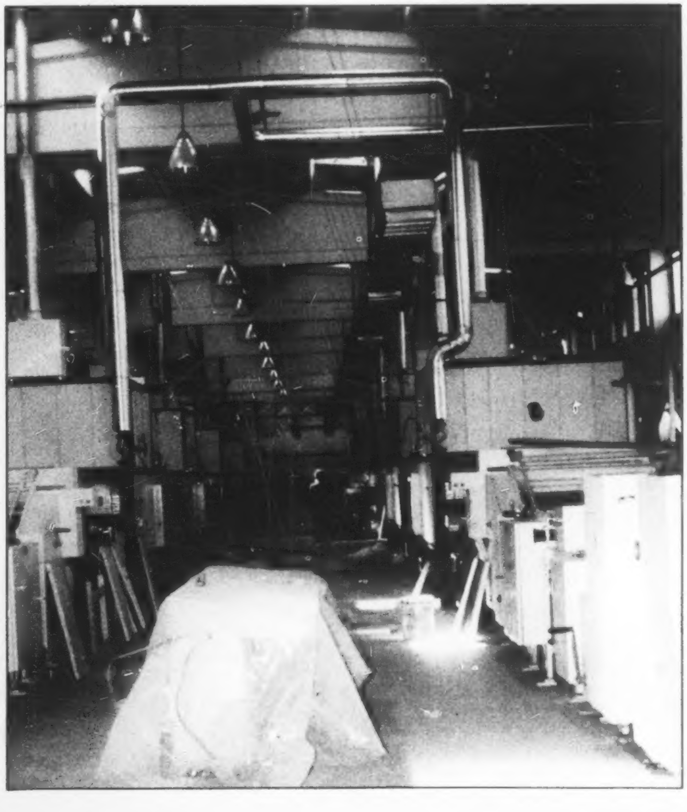
Friday, who led a delegation of American food processors on a five-day Moscow mission in October, says understanding Soviet problems isn't easy.

"The two systems are so different and know so little about each other, that expanded trade relations and joint ventures in food processing have been impeded by lack of knowledge and accurate information."

That may change, however, because of *perestroika*, Gorbachev's massive attempt to restructure and modernize the Soviet economy and improve the flow of consumer goods to Soviet citizens.

The protocol Friday's group signed in Moscow, worked out with two major Soviet agricultural production agencies and signed by a high-ranking official of the R.S.F.S.R. State Agro-Industrial Committee, is the first step towards a new joint organization to make it easier to transfer information on processed food products and technologies.

A glimpse of the future: confectionery factory under construction, at the Kuban state-run agro-industrial complex in the Krasnodar territory. Approximately 1,100 specialists helped in the construction of this state-of-the-art plant—many of them foreign. In fact, 136 flats (at a cost of 50,000 rubles apiece) were built to house professional specialists from other countries.



Gorbachev's view

Gorbachev acknowledged shortcomings in the Soviet food system at a speech he gave in October 1988 to the Central Committee of the Communist Party, managers of *kolkhozy* (collective farms), *sovkhozy* (loosely, "state farms"), and agro-industrial complexes—a speech in which he suggested changing Soviet law to encourage lease contracts.

Processing, storing, and transporting of food are such urgent problems, he said, that this is where Soviet resources should be directed first.

"If today we had harvested everything which *kolkhozy* and *sovkhozy* produced—had transported, stored, processed it, and delivered it to store counters and consumers— then we would have increased the food supply by at least 25 percent, and by some indicators, even by 40 percent."

Soviet economists have calculated, Gorbachev reported, that capital investment in storage and processing improvements is three to four times more efficient for increasing food supplies than investing in agricultural production.

That's one reason the Soviets are out shopping for equipment. They're using part of the 3 billion DM credit line ($1.7 billion U.S.) gotten last October from West Germany's Deutsche Bank AG to modernize their food industry.

It is a condition of the loan that it be used to re-equip light industry, and the West Germans will scrutinize the projects to ensure there is no military content.

On the Soviet side, the loan is underwritten by Vneshekonombank, the main finance arm of Soviet foreign trade. The repayment period runs for up to 13 years on market-related terms.

The West German loan is by no means the only one.

Reportedly, Italy is extending credit. And in London, the Moscow Narodny Bank is rumored to be seeking credits of between $1.5 billion and $2.5 billion. A loan from France is under discussion, and the Russians are also thought to be looking towards Japan.

U.S. Department of Agriculture staffer Edward Cook reports the Soviets have said the value of new equipment delivered to their food processing plants in the eight-year time frame of 1988-95 will total 43 billion rubles ($63 billion U.S.).

That's a considerable per annum jump from 2 billion rubles (U.S. $2.9 billion), the value Cook places on food processing equipment deliveries (domestic plus imports) to the Soviets during 1987.

One caveat, however: Though projected expenditures sound appealing to equipment manufacturers, Cook cautions that historically the import share of Soviet expenditures for food processing machinery has been low.

What would the Soviets like to buy?

What technologies do the Soviets need?

Let's look first at a representative (though admittedly random) sample of the sorts of things they already have and are already doing. These, of course, vary widely—partly because of previous constraints on obtaining equipment, and partly because traditionally the Soviets have concentrated on producing and distributing very locally.

•In Pyltsamma, near Tallinn, the apple juice plant run by the Estonian Cooperative Union uses equipment that collects the volatile essences and adds them back to the apple juice for enhanced intensity.

•At the state-run Kuban confectionery factory under construction, the technology compares favorably with the most modern American cookie or cracker plants, according to Dr. Walter L. Clark, who led the U.S. People-to-People delegation.

All the pastry products from this factory will be lapped dough. The conveyor systems are stacked above each other. The dough is allowed to fold itself on the belt below, a technique, Clark notes, that produces flaky pastry because dough and shortening are interspersed time after time.

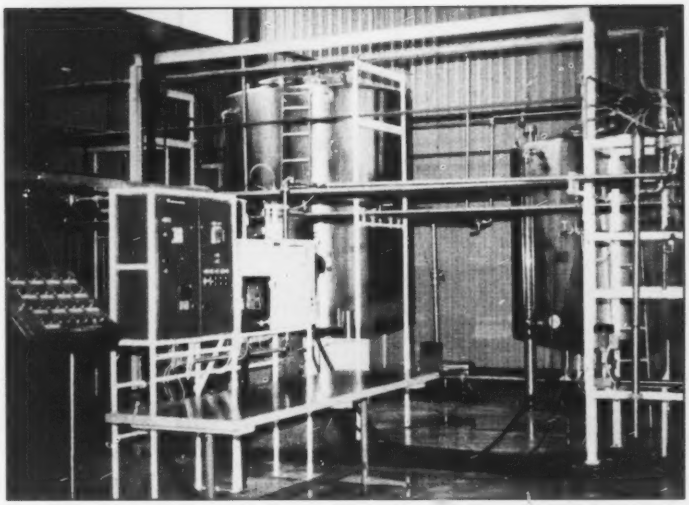
The factory uses a modern pneumatic dry handling system with Italian, German, and Swiss dough mixers and ovens.

•Fritz Friday characterizes the frozen potato plant in Koloss, on the outskirts of Moscow, as state-of-the-art production of potato patties, frozen French fries, and similar products—a European-supplied, turnkey operation.

•Soviet scientists are looking at new technologies. *Centrosoyuz Review*, a monthly magazine, reports that intensive research work has been conducted at the Novosibirsk Institute of Cooperative Trade—research that will help diversify the choice of food products and improve their quality by extensively using local resources.

•Under an agreement between the Institute and the Russian Federation Union of Consumer Societies, staff members of the food commodities department have developed a technology for processing wild-growing berries, such as blueberries and bilberries, without adding sugar. The berries are deep-frozen, or preserved by means of acids and their own salts. This technology is being adopted first in the Tomsk region.

•*Centrosoyuz Review* reports that scientists have developed recipes for new kinds of confectionery, blended juices, and beverages based on wild-growing berries, including viburnum and ashberry, both abundant in Siberia. For example, additives such as ashberry meal or preserved ashberries make it possible to lower the sugar content in confectionery.



A modern apple juice processing plant at Pyltsamma, near Tallinn, uses 8,000 tons of apples per season. Sweden and Switzerland supplied much of the equipment. An adjacent winery, which was mothballed since Gorbachev's cutback on alcoholic beverages, may be back in operation if restrictions are relaxed.

Centrosoyuz: functions and structure

Centrosoyuz (the Central Union of Consumer Cooperative Societies of the U.S.S.R.) is a 90-year-old organization that includes 60.1 million shareholders; 7,123 consumer societies; and 888 district consumer unions.

It is responsible for management of cooperative production units, including agricultural and handicraft items and imports of items related to the cooperatives' activities. It was previously permitted to establish direct business links with other countries, but was not allowed to purchase food processing equipment, which was only done by the state.

However, since the passage of a July 1988 law on cooperatives, Centrosoyuz can purchase food processing machinery and equipment from foreign suppliers.

The Centrosoyuz food industry sector receives its major technological support from state research organizations; utilizes the recommendations of the State Nutrition Institute; orders equipment mostly at state enterprises; and practices quality control in accordance with state standards and state sanitary inspection guidelines. The food industry sector of GOSAGROPROM (see sidebar on U.S.S.R. agencies) cooperates similarly with the state.

The individual cooperatives that make up Centrosoyuz are "traditional" cooperatives, taxed at 35 percent of profits. Joining a consumer cooperative requires purchasing a share, costing from 25 to 50 rubles. This is a one-time "entrance fee." Then members pay an annual fee of between 10 and 25 rubles. Dividends from these cooperatives are often pooled for "social projects," rather than being returned in cash to the cooperatives' shareholders.

Consumer cooperatives are governed by elected boards of directors, usually from 5 to 7 people, who make day-to-day decisions. They also elect representatives to district cooperatives and regional cooperatives.

Centrosoyuz is very active in food production, the main goal of which is to supply its shops with its own products. It also exports through V/O Sojuzkoopvnestorg, a cooperative foreign trade association. Its main food export items include dried, fresh, canned, and cured vegetables; fresh and dehydrated fruits; cultivated and wild nuts, mushrooms and berries; and honey and various beehive agricultural produce.

The 1987 value of Centrosoyuz's food production was 4.5 billion rubles. Centrosoyuz produces 35 percent of Soviet bread, 26 percent of all beverages, 16 percent of canned food, and 15 percent of confectionery.

The Novosibirsk Institute is also researching changes in mushroom processing. Currently, mushrooms are salted and kept in wooden kegs, making them difficult to ship and sell. A new technology of pickling mushrooms in glass jars keeps palatability high.

These developments are all part of the good news. In many food processing plants, however, technology lags considerably behind Western standards. The recently-released U.S. Department of Commerce study ("Profile of the Market for Food Processing and Packaging Machinery in the U.S.S.R.") reports that only about 40 percent of processed food is packed by using mechanized equipment. Manual work still prevails, the study says, in many branches of the food processing industry.

The shortage of packaging material is very acute. "In one extreme case, one-third of the Soviet production of canned fruits and vegetables could not be shipped to the retail shops because boxes for packaging were not available," the U.S. Department of Commerce study says.

It is not surprising, therefore, that Friday's group, which was received at the Kremlin by First Deputy Chairman of the U.S.S.R. Council of Ministers and Chairman of GOSAGROPROM U.S.S.R. V.C. Murakhovsky, reports the Soviets are extremely interested in diversifying their packaging technology.

Currently 80 percent of processed products in the U.S.S.R. are packaged in glass.

G. Lozovik, chief of Cinotyr, the department of new technology in industry at Centrosoyuz' research center, puts packaging technology improvements first on his "needs" list to increase the amount and quality of food products Centrosoyuz produces. Also on that list: biotechnology, computerization, and the use of new raw food components, including wild berries.

Joint ventures

Joint ventures, too, should offer new opportunities for American food processing companies. "The Soviets singled out baby food, citrus processing, vegetable processing and freezing technologies," Friday reports.

Getting a project going, however, isn't going to be simple.

George Melnykovich, president of the Food Processing Machinery & Supplies Association (FPM&SA) and a member of the trade mission chaired by Friday, describes a discussion during that group's recent Moscow meeting.

"What joint ventures do you have in mind?" a U.S. delegate asked.

"As an example," said the Soviets, "we have a need for baby food. We could get together with American companies to make baby food. We will provide space, plant, and labor, while you provide technology, machinery, and production know-how. We will take a portion of the output for the Soviet domestic market, and we will give you a portion for export."

"That sounds fine," Melnykovich told *Food Engineering*, "until you look at the baby food market. Telling an American company they'll get their money back in baby food, requiring them to compete in a very tough market, isn't realistic. But it is an opener that can lead to further talks."

Melnykovich says FPM&SA member co-

Peter Mutskil, general manager of the 23 agricultural markets in the greater Kiev area. Consumer cooperatives for the wholesale purchasing of goods and necessities have existed for over 100 years. Lenin (whose picture hangs on the wall behind Mutskil's desk) encouraged their development as a distribution system for food and consumer goods.

Centrosoyuz trade, purveyance, and industrial enterprises

(12-month projections, 1/1/88 through 12/31/88)

Retail operations (000s)	
Trade enterprises	390.0
shops	319.1
floor area (sq.m.)	25,615
shops operating as self-service units	239.3
Public food service enterprises	108.0
number of seats	5,216
Storage (potatoes, vegetables, fruit)	
Total capacity (000s tons)	2,523.4
Refrigerators (000s tons)	1,057.5
Reception and purveyance centers	473,000
Industrial enterprises (000s)	
Total	21.3
bread-baking plants and bakeries	11.5
Production (in units as indicated)	
Main types of products:	
Bread and bakery goods (tons)	11.0 million
Canned food (cans)	1,850 million
Sausage goods (tons)	335,100
Confectionery goods (tons)	183,000
Non-alcoholic beverages (deciliters)	81.9 million
Beer (deciliters)	21.9 million
Processed vegetables (in tons)	248,000
Total consumer goods, food and non-food at retail prices (millions of rubles)	8,313.1
Non-food products	719.1
Agricultural products (raw materials, in 000s tons):	
Potatoes	8,285
Vegetables	6,466
Fruit	1,241
Melons	1,698
Wild fruits and berries	73
Meat (weight after slaughter), including meat products	1,486
Eggs (millions)	7,245

Source: Centrosoyuz

panies have been asked to respond to a Soviet RFP (request for proposal) for a facility to process 25,000 tons of apples per season in the Krasnodar territory, east of the Black Sea.

As Melnykovich sees it, American companies who want to work with the Soviets will have to be able to identify what Soviet manufacturing capacity is for specified products. They'll also need to use American marketing expertise to spot opportunities for an equitable ROI in terms of technology and equipment.

Still, while joint ventures with the Soviets are underway (70, or so, of them across various industries), then-U.S. Trade Representative Clayton Yeutter cautioned U.S. companies against unrestrained optimism.

"Gorbachev makes statements about market openings," Yeutter told a Chicago audience in the fall of 1988, "but in fact there's a large difference between rhetoric and reality in the Soviet Union.

"That is a very rigid society. Companies expecting to do business in the Soviet Union better be in it for the long haul and expect lots of trials and tribulations getting their joint ventures underway."

However, Nikolay Pervov, agricultural attache at the Soviet Embassy in Washington, says he knows of eight projects "in very active negotiations to establish joint ventures."

One group of seven American corporations that's been working since spring 1988 to explore joint ventures is the American Trade Consortium (ATC), whose president

Who's who in the U.S.S.R.

•*GOSAGROPROM*:
Umbrella agency that plans, finances, and supplies all sectors of agro-industry. Currently negotiating with a number of U.S. companies about joint ventures. Interested in various types of cooperation with the U.S.

•*Ministry of Machine Building for the Light and Food Industries and Household Appliances*:
A ministry under GOSAGROPROM, responsible for process machinery manufacture.

•*Defense Ministry*:
USDA staffers feel that in 1988 the Defense Ministry was given greater authority for overseeing the manufacture of processing equipment.

•*Ministry of Trade*:
Responsible for management of food retail stores, restaurants, and cafeterias, including procurement specifications for related equipment.

Centrosoyuz:
See separate sidebars.

•*Ministry of Foreign Trade*:
Directs and oversees Foreign Trade Organizations (FTOs). Responsible for fulfillment of import plans.

•*Foreign Trade Organizations*:
Independent economic organizations. Specialized units of the Ministry of Foreign Trade that purchase foreign products on behalf of end users.

•*TECHMASHIMPORT*:
Responsible for imports of refrigeration equipment.

•*PROMASHIMPORT*:
Responsible for imports of packaging machinery and equipment.

•*TECHNOPROMIMPORT*:
An FTO with responsibility for imports of food machinery and equipment.

•*U.S.S.R. Chamber of Commerce and Industry*:
Works closely with the Ministry of Foreign Trade to organize trade exhibitions in the U.S.S.R..

•*State Committee for Science and Technology*:
An advisory body that is responsible for advising on the selection of foreign suppliers of technology and equipment.

is James H. Giffen, chairman of the Mercator Corporation and president of the U.S.-U.S.S.R. Trade and Economic Council.

Among the corporations: Archer Daniels Midland, with top priority interests in oilseed processing, edible oil refining and the production of starch and sweeteners; and RJR Nabisco, which planned—at least before the buyout—to become actively involved in the production of its tobacco, cracker and biscuit products and cereals, as well as the development of food manufacturing processes with the Soviets.

Giffen notes that the ATC's timetable, (which he says is currently on schedule), calls for a Soviet-U.S. general trade agreement to be signed in January 1989.

"Approximately 20 to 25 joint ventures will be concluded anywhere from 30 days to 180 days after that date," Giffen says. "We expect plants to be constructed and operational within one to two years after the conclusion of the joint venture agreement."

Giffen characterizes negotiations as "cordial, business-like, and productive."

Terms of the ATC's proposed joint ventures haven't been released, which isn't surprising, since the joint venture agreement still is being negotiated.

But terms of one new food-related joint venture have been reported by *Centrosoyuz Review*.

In May of 1988, the Lebanese firm Dris, the Cooperative Food Industry Department, and Soyuzkoopvneshtorg (the Centrosoyuz cooperative association for external economic ties) signed a protocol on plans to establish a Soviet-Lebanese joint enterprise to produce tinned goods. The venture will take shape in Soviet Armenia or the Crimean region of the Ukraine.

Soviet participants will have not less than a 51 percent share in the authorized investment, and the foreign partner will have not more than a 49 percent share.

Under the agreement reached, the Soviets will provide a plot of land and the right to use it; energy resources; raw materials and circulating assets in rubles and foreign currency; and engineering facilities and piping—with a list of these requirements to be determined during technical and commercial talks.

The Lebanese partners will provide various technological, crating and cold-storage equipment; and will work out the details for furniture, tools, automatic devices and spare parts. The Lebanese will design, plan and create specifications for the venture, "with due account for high economic efficiency"; will study world market demand to determine the appropriate level of output for the joint venture; and will contribute part of the circulating assets in foreign currency.

The foreign currency dilemma

The new economic climate that Gorbachev is championing and the broadening of trade he envisions should lead to more opportunities for American manufacturers.

If, that is, some of the financial issues can be resolved.

One message from the Soviets came across loud and clear, according to Melnykovich: "The Japanese, the West Germans, and Western Europeans in general are very interested in our business. You Americans aren't the only game in town."

Although the U.S. Department of Commerce supports more trade with the Soviet Union, Melnykovich says, the Jackson-Vanek amendment, intended to pressure the Soviets into increasing Jewish immigration, prohibits favored country status for the Soviet Union – a situation he sees as inhibiting trade, since guaranteed loans and similar programs are not available to the Soviets.

Melnykovich is eager to see how the Bush administration will respond to these issues.

A crucial problem for food processing companies and equipment manufacturers: the Soviets' limited supply of hard currency, and the fierce competition for it among Soviet government agencies.

As a result, the need for products with export value may drive product development priorities, Melnykovich says. "The Soviets will be looking to develop products that satisfy domestic needs, while still having some excess capacity for working with trading partners, using that excess to capture hard currency."

Since the ruble isn't freely convertible, the volume of centrally-planned imports of food processing/packaging equipment also depends largely on Soviet hard currency revenues. These, in turn, are influenced by the world oil market, the downturn in gold, and by Soviet expenditures required to import grain.

Barter is one answer to the currency problem, but new ones may be needed. "If you can't get your money out of a joint venture, what good is a joint venture?" asks NFPA's Friday.

Melnykovich is hopeful, however, that creative solutions can be worked out. "Once you get the Soviets talking, even if it's about baby food, you can look at something more marketable," he says – "something in which we can get a fair ROI. Maybe joint ventures will have to be created in an economic zone that isn't the free enterprise system, or the Soviet Communist system, but which is something in between."

New economics

If the currency situation can be worked out, there's plenty of opportunity for non-Soviet companies to sell to the state, collectives, and consumer cooperatives.

In processing machinery, the potential for sales as the Soviets modernize certain of their plants is substantial. For instance, Dmitrii A. Yesipenko, GOSAGROPROM board member who heads its Department of Collective Farms, says collective farms own 900 processing shops and canning plants. They manufacture 770 million cans of products.

In terms of money, he reports, collective farms' capital funds exceed 170 billion rubles.

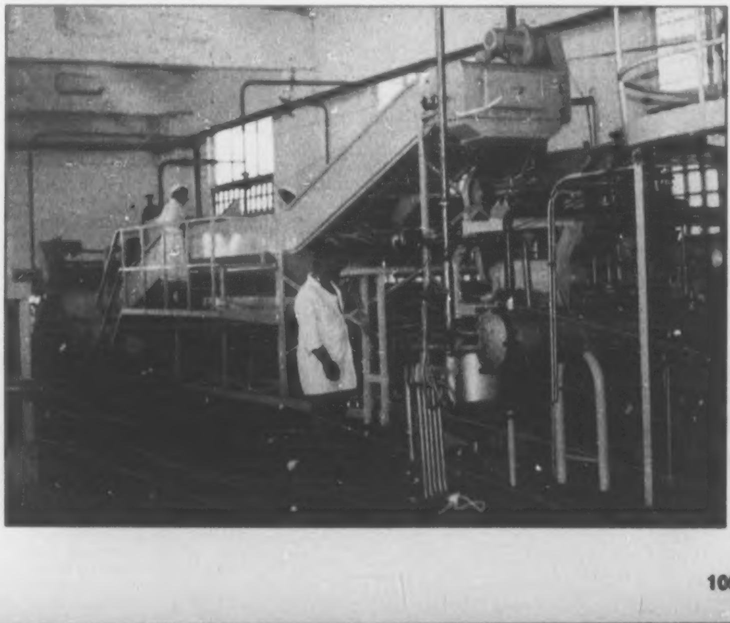
"The new economic mechanism which is being introduced nowadays, together with the law on cooperatives in the U.S.S.R. and model rules of a collective farm, grants collective farms broad rights to carry out their business operations independently, including cooperation with foreign partners," Yesipenko says. "These measures are called upon to drastically change the socio-economic status of the agricultural sector of the country."

Perestroika is also changing consumer cooperatives. "Many features characteristic of cooperatives fully meet the interests of *perestroika*," says Centrosoyuz Vice Chairman Nikolai Lupei. The flexibility of cooperatives gives them an advantage in helping to satisfy the population's requirements for foodstuffs.

New approaches to organizing trade services and food service operations in rural areas call for the setting up of an extensive network of complex purchasing and processing enterprises in the countryside in the next few years.

Obviously, this Soviet trend of shifting food processing into the agricultur-

Tomatoes are washed, sorted, and travel up a conveyor belt for processing in Kaspi, near Tbilisi, 160 kilometers north of the Turkish border. This is one of five cooperative canning factories in the Republic of Georgia. People-to-People's delegation of food processing and packaging specialists were the first Americans ever to visit the town.



al regions where foodstuffs are produced – a trend that makes sense, considering the vastness of the country, the logistics of shipping, and the local preferences for ethnic foods – represents opportunity.

In addition, Centrosoyuz plans to increase drastically the buying of agricultural produce and the processing of farm goods.

"We conclude ever-more-long-term contracts with owners of private households, paving the way for guaranteed sales of foods they grow in their gardens," A. Krashennikov, head of Centrosoyuz' International Department, told a Soviet-Scandinavian symposium on cooperatives in September. "This year we have signed over 13 million such contracts."

The future

What's in the offing for the Soviets?

Through the new *glasnost*, or openness, Americans may learn more about Soviet agro-industrial plans at future meetings of the U.S.-U.S.S.R. government-to-government working group representing the food processing industry.

On the Soviet side, Centrosoyuz Board President Deputy P. Fedirko says cooperative purchasing and manufacturing centers are being set up to purchase all farm surpluses, pre-process all product bought on their own premises, and market the output. *Centrosoyuz Review* reports that more than 3,000 centers have been opened. By the end of the current five-year Soviet plan, another 26,000 are to come onstream.

Also ahead: more autonomy for decision-making, as "democratization" enables more Soviet organizations and workers to exert decisive influence on the economic restructuring that is Gorbachev's goal. This, however, may lengthen negotiations for "foreign" companies doing business with the Soviets, as the question of just who has the ultimate decision-making power is being resolved.

One thing's certain: Patience and perseverance are needed. So is creativity. But the opportunities are there.

As Melnykovich puts it, "When you're talking about international trade, basically there are a lot of base hits, but only two home runs: the Soviet Union and the People's Republic of China."

JAN BONE
Contributing Editor
An associate member of the Society of Manufacturing Engineers, Jan Bone has an award from the American Political Science Association for distinguished reporting.

For further information....

Government

- "Assessment of the Soviet Food Program." For ordering information, contact Economic Research Service, U.S. Department of Agriculture, 1301 New York Avenue NW, Washington DC 20005-4788 (202-786-1620).

- "Situation and Outlook Series: U.S.S.R. Agriculture and Trade Report." Annual subscriptions and single copies are available from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington DC 20402. For prices and ordering information, call GPO order desk, 202-783-3238.

- "U.S.S.R. Agriculture and Trade Report." Summaries and full reports, including tables, are available electronically through USDA's EDI system. For details, call 202-447-5505.

- A newly-released 163-page study for the U.S. Department of Commerce is available for purchase. The study contains tables, general industry data and trends, and profiles of various industry sectors. All four sections of the extensive study on U.S.S.R. Food Processing and Packaging (IMR 8705) are available at district and branch offices of the Department of Commerce, using the Commercial and Information Management System.

Private sector

For information on the new clearinghouse being established for information on science and research joint venture opportunities, and export/import arrangements related to food production and processing, contact the National Food Processors Association, 1401 New York Avenue NW, Washington, DC 20005 (202-639-5900); or contact the Food Processing Machinery & Supplies Association, 200 Daingerfield Road, Alexandria, VA 22314 (703-684-1080).

At Centrosoyuz headquarters in Moscow, Anatolii A. Fomin (left), deputy head of the Food Processing Department of Centrosoyuz, and Georgii Y. Lozovik, chief of the Department of New Technology in Industry, Centrosoyuz Research Center, examine an American frozen food package.

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CHILTON'S FEBRUARY 1989

FOOD ENGINEERING

SINCE 1928, THE SOURCE ON PROCESSING, PACKAGING, AND PRODUCT DEVELOPMENT

NUTRITION

"It is very possible to have a highly concerned public with respect to diet and health issues which is not very knowledgeable about detailed nutrition facts that could help them to effectively implement these concerns." *Dr. Al[illegible] S. Levy, Center for Food Safety and Applied Nutrition.*

"Much of the information on current nutritional labels is irrelevant—vitamin deficiency is not a major problem in the U.S. diet." *Bruce Silverglade, Center for Science in the Public Interest.*

3

"The major [illegible] lem with nutritional education is that all sources don't speak with th[illegible]." *[illegible] r. Paul F. Hopper, I[illegible] ood Technologists.*

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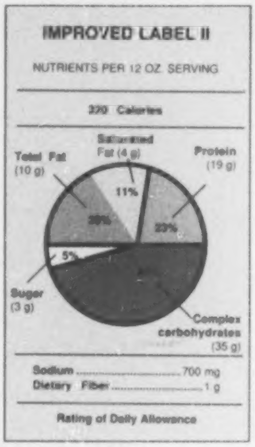
FOOD ENGINEERING



COVER STORY

As consumers are demanding more nutritional information about food, can manufacturers objectively educate the public *and* maintain a healthy bottom line?

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This month's report focuses on the onslaught of new bakery and cereal products containing oat bran.

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The hurdle method represents barriers of different intensities which may prevent microbial growth in food products.

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Cheerios
OAT BRAN
NEW!

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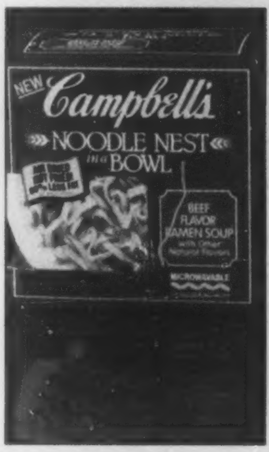
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Campbell's
NOODLE NEST
in a BOWL
BEEF FLAVOR RAMEN SOUP
with Other Natural Flavors
MICROWAVABLE

Special Emphasis

ETHNIC INGREDIENTS

Ethnic food watchers agree that Mexican food is taking the country by storm with no sign of fading, but Oriental food continues to carve its niche.

Pages 73 to 81

MEXICAN AND ITALIAN DOMINATE

Mexican food sweeps the country while Italian food maintains a firm grip on its own territory. The wild fire growth of Cajun food abates as the category finds a niche for itself alongside of Oriental food.

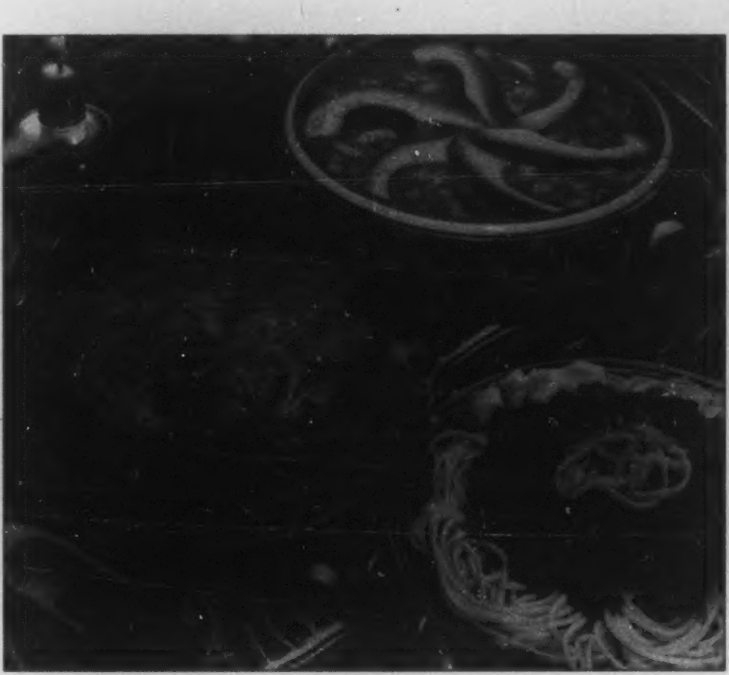
Ethnic food watchers agree that Mexican food is taking the country by storm with no signs of petering out like past fads. Annual retail Mexican food sales through September 1988 topped $606 million, representing an increase of almost 9 percent compared to the same period in 1987. This figure comes in second to Italian food sauces whose annual retail sales through September 1988 beat all other ethnic categories with sales just over $1 billion, an increase of 9.3 percent compared to the prior period in 1987.

The most likely consumers of Mexican foods are people with dual incomes between the ages of 35-44, with children under two, or ages in the 12-17 year old range, and with incomes over $60,000. These figures, according to Packaged Facts, spell good news to Mexican food producers, since households headed by 35-44 year olds are expected to grow by 28 percent between 1988 and 2000.

The growth of Mexican foods has closely followed the tracks of Mexican food restaurants such as Taco Bell and Chi-Chi's that have launched chains throughout the U.S. From 1983-1989, Taco Bell doubled its unit count (2,696 by the end of 1987). Chi-Chi's plans to build 12 new units over the next year in Midwest and mid-Atlantic areas. El Torito, another Mexican chain based in California, also expects to continue its growth, although at a more conservative rate than its earlier record of 20 units a year in the early eighties.

Some of the large food processors are clammering to join the rest of the country in saying olé to Mexican foods through the introduction of new products:

- Nabisco Brands, Inc. added refried beans, taco shells, tostado shells and Mexican garden salad to its *Ortega* line.



Chili powder is a favorite used in many Mexican dishes such as stacked enchiladas and soup. Cincinnati Chili is served over spaghetti and contains spices in addition to a surprise ingredient—chocolate. Photo courtesy: American Spice Trade Association.

- Birds Eye has *Microwave For One* in a Rice Mexican variety.
- Frozen burritos have been spiced up by Olympia Foods, Inc. with three varieties: beans and rice; bean, rice and cheese; and quesadilla.
- Culinary Brands, Inc. added grilled beef fajitas to its *4 Chefs Fresh Food To Go* line.
- Eagle Crest Foods unveiled six varieties of enchiladas with its *El Charrito Light Entree* line.
- Chimichangas and beef and bean burritos have been added to ConAgra Frozen Foods' *Banquet* dinners.

"Tacos continue to be the top ethnic food choice away from home and now they're threatening lasagna's spot as the favorite

PATRICIA DILLON
Senior Associate Editor

ethnic food at home," said Edmond Mozes, vice president of MRCA Information Services of Stamford, CT. He cited a 31 percent increase in taco consumption at home during the past five years.

Ethnic foods which demonstrated dramatic growth according to the study were burritos, refried beans and enchiladas. Frozen Mexican entrees showed a 12.5 percent growth in 1988 with annual sales totaling more than $245.5 million, according to Selling Areas Marketing Inc. (SAMI) figures computed through September 1988. Sales of canned tortillas jumped 17.6 percent with sales of $2.3 million in 1988 and dry taco shells showed an increase of almost five percent to $75.8 million.

Mexican canned sauces showed a dramatic increase in sales within the Mexican food category with sales of $307.6 million in 1988, an increase of almost 15 percent.

Hispanic marketing

Selling Mexican food to non-Hispanic Americans is one thing. Selling Mexican foods to Mexican-Americans is a whole 'nother enchilada. Hispanic consumers seek authentic flavors as well as familiar trappings such as packaging. "First generation Mexican-Americans prefer to buy salsa casera in a tin since that's the packaging used in Mexico," said John Gill, vice president and managing director of consumer ventures for McCormick & Companies product group of Hunt Valley, MD. "However in the U.S., salsa is sold in jars since gringos don't like tin."

The Vons Companies of El Monte, CA, a parent company of supermarket chains, decided a supermarket marketed specifically with Mexican-Americans in mind would be a worthwhile effort since 35 percent of Southern California's population is of Mexican descent. As of the 1980 census, Hispanics comprised approximately 3.4 percent of the total U.S. population and that figure is expected to blossom to 10 percent by the year 2000.

Campbell Soup of Camden, NJ has made a serious effort to sell to the Hispanic market. It acquired the *Casera* and *Caserita* brand names whose marketing goal will initially be the Puerto Rican community in New York and Cubans in southern Florida. A longer term marketing goal is to woo Hispanics in the Southwest and eventually Anglos living on Main Street, U.S.A. In addition, the firm has a U.S. Hispanic division located at its Vlastic Foods unit in Bloomfield, MI.

As Campbell's positions itself as a contender in the Hispanic market, it has found that there are some production problems endemic to ethnic foods. Everardo Aguilar, product development technologist at Campbell's Hispanic division, said that while 90 percent of the Mexican foods he works with adapt well to current production technology, certain procedures that have traditionally been done by hand have yet to be automated, such as folding tamales or burritos.

A problem arises when striving for an authentic look using automated equipment. "Shredding meat is a problem," said Aguilar. "We can dice meat with no problem but it's tough to launch new products that should have that homemade look that only shredding will give."

Spicy demands

Dave Derrick of Milwaukee Seasoning Laboratory's research & development department in Germantown, WI, said Mexican food producers have the highest demand for spices. But a problem that arises with spicy foods is that the volatile oils in the spices are often lost during high temperature processing. The usual solution is to add more spice to make up for the loss.

Another solution to the problem of flavor loss, according to Baltimore Spice's Austin Jacobus, is to use higher quality spices that not only contain more flavor but have less oil to lose.

"Our job is to know what flavor loses its high notes and which don't; then we formulate around it," said Tony Grenis, manager of technical services at Saratoga Specialties, Elmhurst, IL. Red pepper, cumin, cilantro, onion, garlic and jalapeño peppers are typical spices used in Mexican foods, he added.

"If a loss in flavor is noted during test batches," said Roger Maehler of Heller Seasonings of Bedford Park, IL, "then use of the spice is discontinued and extracts or ground spices are used as alternatives." Spice oil volatility can also be adjusted by encapsula-

Campbell Soup Company's latest plunge into the ethnic market consists of its new line of oriental-style ramen noodles.

NEW
Campbell's
NOODLE NEST
BEEF FLAVOR RAMEN
NEW
Campbell's
NOODLE NEST
IN A BOWL
BEEF FLAVOR RAMEN SOUP
MICROWAVABLE

tion or by reducing vapor pressure, said Michael du Bois, vice president and general manager of the flavor division at Firmenich Inc., Princeton, NJ.

He added that ethnic foods often call for fresh ingredients that can complicate processing. Cutting, handling and the aroma of freshly chopped onions present difficulties. "Using dehydrated onions circumvents these problems but sacrifices flavor. Food technologists work with prototypes in the effort to strike a balance between logistics and flavor," said du Bois.

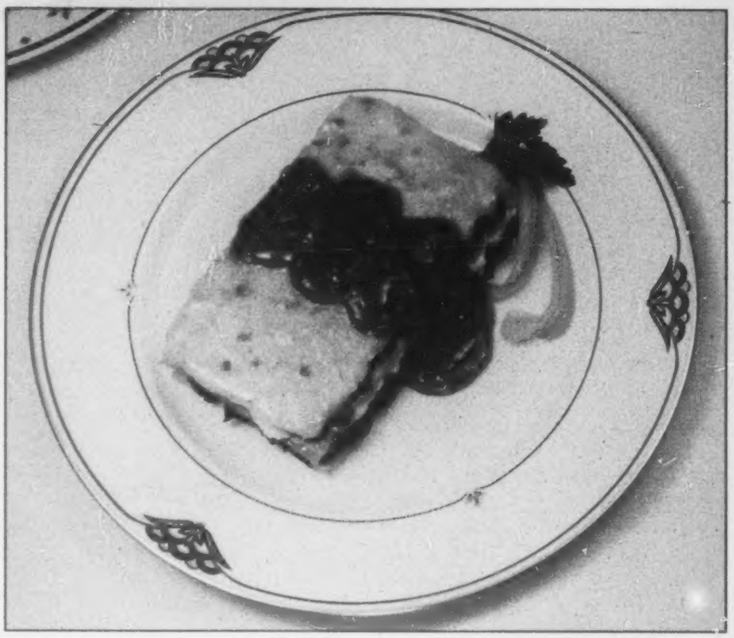
Too hot to handle

All food companies have learned that flavor must be adapted to American palates. Even if a cuisine is well accepted in one area of the country, it must be carefully formulated to be a hit nationally. Usually, this means the volume of spiciness must be toned down.

"Mexicans use hot peppers as frequently as most Americans use salt," said Georgene Pijut of FIDCO, White Plains, NY. "In Cajun country, people use hot sauce as casually as most of us use ketchup."

Nancy Rush of Quest International of Owings Mills, MD equated the ethnic food experience with learning to walk. "Americans first ate tacos before they tried dishes like molé," said Rush. Molé is a salsa that incorporates three or four types of chili along with thirty other ingredients such as peanut and sesame. This increase in taste sophistication can be seen in many supermarket aisles where larger assortments of more ethnic foods can be found.

Mexican flavors are the biggest ethnic flavor demand experienced by Ottens Flavors of Philadelphia, according to Richard Mangiere, vice president of R&D. Once sales people determine what food processors are seeking, R&D personnel start work on developing flavors most in demand. Ottens discovers the best ethnic flavor standards by dining at topflight ethnic restaurants, said Mangiere. Home economists cook up a prototype with all the ingredients called for in a recipe and R&D tries to boil it down to a few basic flavors that can be replicated in mass production.



America's passion for Italian food started gently with spaghetti and reached new peaks with zestful specialities such as Lasagna Al Forno (spinach lasagna). Photo courtesy: Fritzsche Dodge & Olcott.

At Edlong Corporation in Elk Grove Village, IL nacho flavor is a top seller, according to Ralph Moser, vice president of laboratory, department of applications. Close on the heels of nacho are other Mexican favorites, such as chili, jalapeño and taco flavors.

Italian hangs tough

Although Mexican foods are the fastest growing segment within the ethnic food category, Italian foods remain a tough act to follow. While Italian sauces went over the bil-

Comparative growth rate percentages within the ethnic foods market

Period	Industry Average	Italian Foods	Hispanic Foods	Italian Sauces	Pizza	Oriental Foods
1977-1982	11.9	8.7	15.8	19.0	11.6	13.5
1982-1987	7.8	6.5	12.0	8.3	4.3	9.6
1987-1996*	8.1	8.2	8.7	8.0	6.2	8.7

*-Estimate
Source: Business Trend Analysts.

For the past several years Hispanic food has been the fastest growing ethnic food.

RONZONI
NZONI
NZONI
ONZONI

Though the Mexican wave is fastest rising, interest in Italian food remains very strong. Ronzoni has introduced added convenience with a new line of shelf stable pasta dishes.

lion-dollar mark in 1988, the frozen food area rang up sales of $827 million through September 1988, an increase of ten percent.

In fact, America's amoré for Italian cooking has been going on for so long and with such intensity that many no longer consider pasta and pizza to be ethnic. A similar spell has been cast by chili and bagels, which shucked their ethnic identity years ago to become "classic American" favorites.

Alan Miller of SAMI draws parallels between America's newly developed palate for spicy fare from south of the border and the resurgence of Italian foods thirty years ago.

In the late 1960s, the demand for Italian sauces first started to burst from the seams of Italian neighborhoods in Boston, Buffalo and New York. Regional brands of spaghetti and sauces were later bought by large food conglomerates who sought to replicate the regional brands' success nationally. However attempts to create a truly accepted national brand of pasta has failed up to this point because of tremendous brand loyalty within local areas. A homemaker often has the same brand of pasta on the cupboard shelf that mom or grandma used to buy.

As a result, corporate strategy has been to acquire regional brands and maintain them within their home markets. Borden with adminstrative headquarters in Columbus, OH has recently bought Prince Macaroni of Lowell, MA and owns regional brands such as *Creamette, Vimcoy, Ronco* and *Luxury*. Hershey's Pasta Group of Hershey, PA follows a similar strategy through its ownership of regional brands such as *San Giorgio* and *Mickey Skinner*.

In 1989, Ronzoni will launch a five-dish line of shelf-stable entrees that will require only ten minutes to prepare. No artifical flavors will be used and its convenience will be emphasized.

Supermarket shoppers are now fluent enough in identifying pasta to be able to buy various shapes whose names they couldn't even pronounce a few years before. This increase of sophistication has seeped into other areas, such as sauces and entrees. Among the newly announced sauces of 1988:

- Contadina has launched a line of six pasta sauces: Alfredo; Italian Clam; Spinach & Parmesan; Tomato & Garlic; Tomato & Italian Sausage; and Tomato & Mushroom.
- Thomas J. Lipton, Inc. is spooning out *Lipton Sauce Ups* in six new varieties, including Italian Tomato.
- Presti's *Italian Seasoning for Pizza* and a spicy version are the latest entries in the pizza sauce category.
- Young urban professionals can now stay at home to enjoy Italian breaded mozzarella sticks offered by Giorgio.
- Frito-Lay, Inc. went Italian with its introduction of *Italian Cheese Flavored Potato Chips* whose ingredients list Parmesan, Romano cheese and extracts of rosemary.

A spice company, F&C International of Cincinnati, OH developed a new natural Italian seasoning for snack products.

Oriental chow

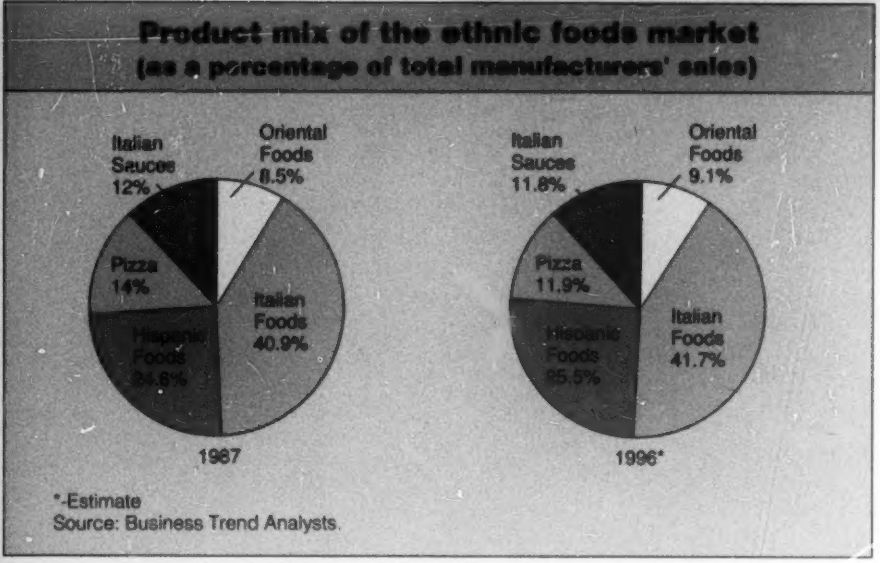
Retail sales of oriental foods for 1988 totaled $255.5 million, an increase of 3.7 percent. Canned oriental noodles jumped 14.5 percent to $1.7 million during the first ten months of 1988, according to SAMI. Companies that launched new products in 1988 within the Oriental category:

- An oriental flavor in the Birds Eye line of *Microwave for One* entrees.
- Uncle Ben's addition of broccoli rice, three flavor fried rice and sweet 'n sour chicken to *Suzi Wan Stir Fry Side Dishes*.
- Prepared Products with its five varieties of oriental and teriyaki flavors of turkey jerky.
- Sakura Noodle, Inc.'s *Chikara Udon Oriental Style Noodles* in four flavors.
- *Golden Ramen Oriental Noodles* from Union, Inc.
- Campbell's launched a six-flavor ramen noodle line called *Noodle Nest*.

A flavor company in Cincinnati, OH, Fries & Fries' has released two new flavors: Fried Oriental and Oriental.

As Americans continue to develop their tastes in oriental foods, many are passing up soy sauce for teriyaki sauces. Traditionally, it is made from equal parts of soy sauce, sake and sweet sake. Teriyaki and other sauces showed the most dramatic increase within the oriental food category growing 15 percent from 1987 with sales totaling $38 million for the first ten months of 1988, says SAMI. Soy sauce demonstrated a more modest growth of 4.2 percent with sales of 48.6 million for the same period.

Hasegawa with its American base in Lawndale, CA, offers a line of savory type


Product mix of the ethnic foods market
(as a percentage of total manufacturers' sales)

*-Estimate
Source: Business Trend Analysts.

Italian food continues to be the leading ethnic food category as represented by total manufacturers sales.

flavors, such as Chinese chili and teriyaki. Cold processing is used to improve the taste of garlic and ginger in its sauces.

Another Oriental sauce manufacturer, Kikkoman with its U.S. industrial division based in San Francisco, said its naturally brewed sauces contain fewer calories, less salt and have a more mellow taste.

In January, *Food Engineering* focused on San-J International which brews tamari at its plant in Richmond, VA. (See *FE*, January 1989, page 55.) Tamari is an ancient Japanese seasoning that has less salt than most soy sauces familiar to Americans. Traditional tamari is made of water, soybeans and salt and is naturally fermented for at least six months.

Oriental cooking incorporates much of U.S. current concerns for nutritious food that can be quickly and conveniently prepared. As John Gill of McCormick notes, "fresh is the key word. The produce department has proven to be the most exciting area in the supermarket today. A few years ago, it was thought that frozen foods were going to decimate fresh produce, but that hasn't occurred."

Ragin' Cajun

Just a few years ago Cajun food blew across the country like a storm originating in the Louisiana Gulf. Although it has reached what many have agreed is its saturation point, it continues to hold its own. In 1988, approximately 132 new food products were introduced in the Italian food category; 111 Mexican; 65 Oriental; and 69 Cajun, according to Marketing Intelligence Services, Ltd. Cajun flavor-inspired products in 1988:

- Cajun potato chips were unveiled by Lay, Lance, Tiger Chips and Tim Cascade.
- Pride Corporation cooked up Cajun chicken strips, dinner fillets and fried chicken.
- Several varieties of Cajun mustard came from Roddenbery's, Beaverton Foods, Hudson Valley Homestead, and Sugar's Kitchen.
- *Cajun King Barbecued Shrimp Sauce Mix, Butter Pecan Sauce Mix, Lemon Butter Amandine Sauce, Etouffee Seasoning Mix, Jambalaya Seasoning Mix, Cajun Fry, Gumbo Mix*, and *Seafood Boil* came from the kitchens of Bruce Foods Corp.

Cajun and creole foods by their spicy nature has beckoned innovations from both flavor and spice companies. New product flavors and spice blends of 1988:

- Key Largo Spice Co. debuted *Blackened Seafood* and *Cajun Spice Seasoning*.
- McCormick unveiled *Creole Seasoning*.
- Cajun flavoring is also offered by Flavorite Laboratories, Inc.
- Spice Delight Inc. offered *River Road Blackened Seafood Seasoning, Cajun Catfish Seasoning, Cajun Seasoning* in regular and spicy, *Crab Boil, Creole Seasoning, Gumbo Seasoning, Italian Seasoning New Orleans Style, Jambalaya Seasoning* and *New Orleans Seasoning Chopped*.

Although other categories may be experiencing activity, Italian, Mexican, Oriental and Cajun are the major ethnic food categories attracting the most attention from food research and development departments.

As speculation regarding the next ethnic food trend swings from the Caribbean to Southeast Asia, only one thing remains certain. Americans crave adventurous taste experiences that only ethnic foods can satisfy.

CHILTON'S

MARCH 1989

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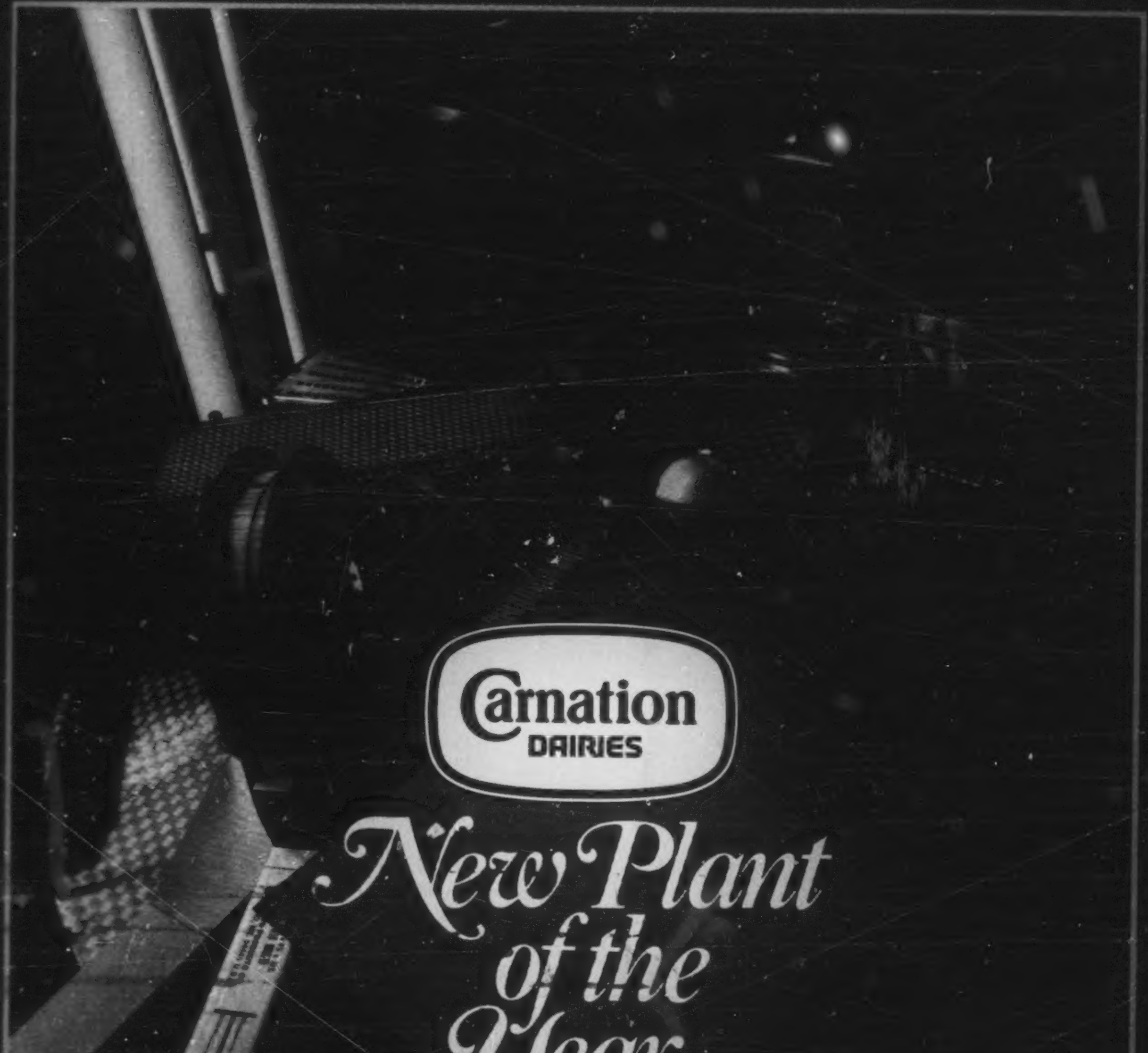

Carnation
DAIRIES

New Plant of the Year

FOOD ENGINEERING

COVER STORY

On October 19, Carnation Co. started-up its new $80-million ice-cream and frozen novelty plant on a 30-acre site in Bakersfield, CA. Plant capacity is more than 35 million gallons of ice cream and frozen novelties per year. Photo by Gregory Murphey, Inc. Chicago.

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This month's Report talks about the rise in sales of cereal breakfast foods as compared to other food categories; the USDA's proposal to reduce inspections at food and processing plants that have good compliance records; FDA's report that pesticide residues are rarely found above tolerance levels in U.S. domestic and imported food supplies; and the Soviet and American trade agreement signed at the IEFP show in Anaheim.

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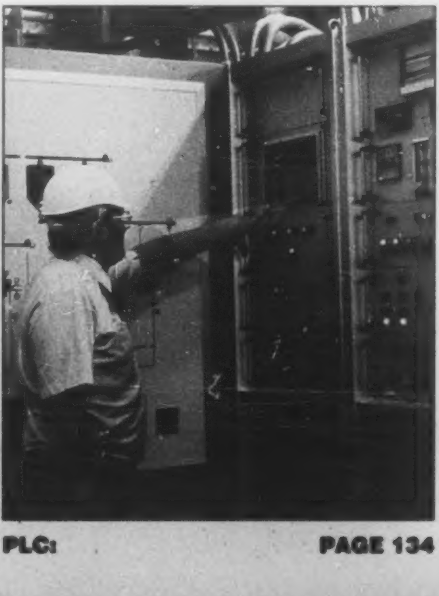

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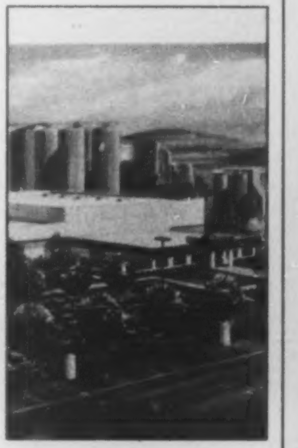

Special Emphasis

SITE SELECTION

Despite the corporate food fights and mergers and acquisitions of the past few years, new food plant construction is up, and so is the need for help in selecting the best site.

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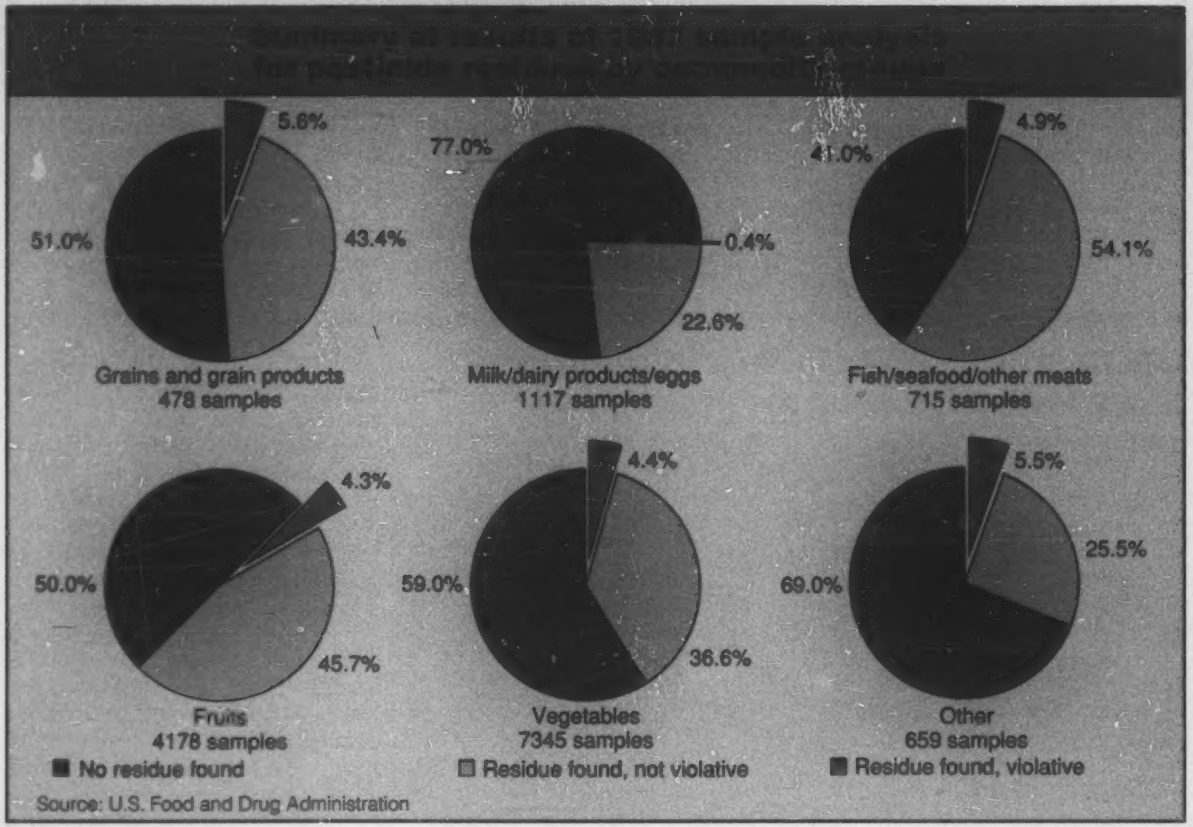
Food supply safe from dangerous pesticide levels, says FDA



Source: U.S. Food and Drug Administration

As the above graphs show, less than one percent of the food samples inspected by the USDA showed pesticide residues that are higher than acceptable levels. No trace of pesticides were detected in more than half of the fresh vegetables and fruits tested. However, pesticide residue values were slightly higher for imported fresh produce.

More than 25 years of FDA monitoring data shows that pesticide residues are rarely found above tolerance levels in U.S. domestic and imported food supplies and that the American consumer is not exposed to excessive levels of pesticide residues, says FDA in its recent report *Residues In Foods – 1987*.

Although no reference is made to the National Academy of Sciences May 1987 report *Regulating Pesticides In Food: The Delaney Paradox*, the FDA report seems aimed at calming consumer fears raised by the controversial NAS report (*FE* July, '87). Media reports of the NAS study focused on its theoretical worst-case scenario that pesticides in foods could cause 20,000 additional cancer cases per year (*FE* August '87). The NAS report did not apply actual pesticide-residue data in its risk assessment, although this data was readily available from FDA (*FE* September '87).

Data compiled over the past 25 years show that "the U.S. population's exposure to pesticide residues is consistently below established safety standards," says FDA, and its report summarizes fiscal 1987 results of the agency's pesticide-monitoring program which "continue to support this observation."

In 1987, FDA reports, 14,492 samples of food in various groups (6,503 domestic and 7,989 import) were analyzed for 253 different pesticides under the regulatory monitoring program. No pesticide residues were found in over 50 percent of the samples, and less than 1 percent of the samples contained residues that exceeded tolerances. As shown in the graph:

- Of more than 3,000 fresh-vegetable samples analyzed, 63 percent contained no residues, less than 1 percent contained residues over tolerances and about 2 percent contained residues for which no tolerance has been established.
- For fresh fruits, no residues were found in 50 percent, less than 1 percent contained residues over tolerance and less than 1 percent contained residues for which no tolerance has been established.
- For imports the picture was basically the same, except that residues for which no tolerance has been established totaled about 4 percent for vegetables and 6 percent for fruits.

- For the 847 domestic dairy-product samples, 76 percent contained no residues and none contained violative residues.
- For imported dairy products, 80 percent of the 270 samples had no residues, no residues were over tolerance, and only 1 percent had residues for an unestablished tolerance level.

These results were supported by 1987 Total Diet Study data, FDA continues. While regulatory monitoring shows that the consumer is not exposed to excessive pesticide-residue levels, the Total Diet Study provides a direct estimate of dietary pesticide intake. In the Total Diet Study, 234 different table-ready food items representative of the American diet are analyzed for more than 200 different chemicals four times each year, for a total of 936 product analyses annually. Although 53 pesticides were found in the 1987 food "market basket," the levels detected were consistently below acceptable daily intake (ADI) standards established by the United Nations' Food & Agricultural Organization (FAO) and the World Health Organization (WHO)—in most cases by orders of magnitude. "For almost all pesticides, the dietary intake is less than 1 percent of the ADI," FDA said.

The study demonstrates that "very low levels of or undetectable pesticide residues in food as consumed," FDA concludes. "These data also show that dietary pesticide intakes are manyfold lower than their ADIs. These findings corroborate the continuing safety of the U.S. food supply with respect to pesticide residues."

USDA trims the fat from inspection programs at food processing plants

USDA meat inspector takes a close look at meat products at a processing plant. Under a new proposal, the USDA may be able to cut down on the amount of inspections made at food processing plants. Source: USDA.

The U.S. Department of Agriculture (USDA) has proposed to reduce meat and poultry inspections at food and processing plants that have good compliance records and increase inspections at operations with poor compliance records. The proposal would not apply to slaughter operations, which would remain under continuous inspection.

The proposal came in the wake of a change in the law that allows the USDA to adjust the amount of inspections performed at processing plants. The federal Meat Inspection Act in 1986 allows the frequency of inspections to be based on the risks posed by each plant's compliance record, the complexity of the processes it performs and its ability to control hazards. The change has also won the approval of the National Academy of Sciences, according to Lester M. Crawford, administrator of the USDA's Food Safety and Inspection Service.

Union blasts plan

The USDA proposal came under fire from the United Food and Commercial Workers International Union, AFL-CIO (UFCW) as posing a threat to worker safety. The UFCW charged that a similar program carried out by the Occupational Safety and Health Administration (OSHA) resulted in "an epidemic of injuries and illness for packinghouse workers along with disclosures that companies failed to keep accurate records."

However, Crawford said the ruling would not affect packinghouse workers since there would be no change in the present system of inspecting slaughterhouse operations. Food processing companies would be trusted to maintain records pertaining to product quality, not worker safety records which is under the OSHA jurisdiction, he added.

The USDA maintains the proposal will strengthen its inspection in 6,300 plants that process meat and poultry by "focusing inspection efforts where they are needed most," according to Crawford. "The proposal is based on years of careful planning and three pilot tests in different parts of the country in various kinds of meat and poultry plants," he added.

The proposed program would utilize a new computerized system that accumulates information from inspection visits. The system would document each plant's record in meeting USDA requirements and keeping track of acceptable and deficient performance. Aided by these records, the USDA would decide the frequency of inspections needed at a given plant.

"Industry will have to assume greater responsibility in conforming to USDA standards, because critical deficiencies found during inspection would mean production delays and product condemnation," Crawford said.

Cereal breakfast foods post gains, consumption of butter melts

[illegible]	
Meat	1.2%
Seafood	1.5%
Processed Fruits and Vegetables	2.9%
Canned	2.5%
Frozen	3.8%
Dairy	2.1%
Cereal	3.0%
Confectionery products	4.5%
Soft drinks	4.5%

Source: U.S. Department of Commerce

The above chart shows the estimated percentage increase in value of shipments from 1987 to 1988.

Although production costs continue to escalate, cereal breakfast foods continue to be a big seller with constant-dollar growth of 1988 ringing up an increase of three percent, according to U.S. Department of Commerce estimates in its *1989 U.S. Industrial Outlook*. While most food categories showed modest gains (adjusted for inflation) of one to three percent, dairy categories, including butter and ice cream showed market losses in 1988. Butter shipments slumped by 11.5 percent while the value of ice cream and frozen dessert shipments dipped by 1.8 percent.

In 1988, estimated per capita consumption of all breakfast cereal gained 1.1 percent. Ready-to-eat cereal was the runaway best seller with product shipments for 1988 totaling $4.96 billion. And as advertisers tout the nutritional value of bran, multigrain and fiber, these cereals showed an impressive gain of 1.9 percent in consumption.

In percentage increase, hot cereal is close on the heels of ready-to-eat. Still, the category remains much smaller than cold cereal: $579 million in shipments in 1988.

Advertising spending continues to escalate with 1987 hitting $664 million, up 25 percent from 1986. Kellogg is the fourth largest network television advertiser and expanded its network budget 43 percent in 1987 (the last year these figures are available). These expenditures represented 78.4 percent of all Kellogg advertising.

Of the total 1987 advertising dollars spent by cereal companies, Kellogg spent 45.7 percent; General Mills, 24.9 percent; General Foods, 16.2 percent; Quaker Oats, 8 percent; and RJR Nabisco, 5.2 percent.

Future shipments of cereal breakfast foods are expected to increase 2.7 percent. Per capita consumption of cold cereal is expected to reach 11.94 pounds in 1989. Per capita consumption of hot cereal is predicted to reach 3.67 this year.

Consumers paid more money for their favorite cereals in 1988 since the '88 drought drove commodity prices up and packaging proved to be costlier. Producer costs for ready-to-eat cereal increased 7.2 percent and hot cereal rose 5.6 percent. Retail prices reflected these costs by increasing 5.9 percent.

Consumers appear to have reached for more dairy foods in 1988 with shipments increasing by 2.1 percent from 1987. Part of this increase was due to the 5.5 percent growth in shipments of condensed and evaporated milk being countered by the 11.5 percent plummet of butter.

Cheese showed continued strength, led by Italian varieties. Shipments of cheese increased from 1987's $11.6 billion to $11.9 billion in 1988. This upward trend is expected to continue into 1989 with shipments predicted to reach $12.5 billion.

The domestic fruit, vegetable and specialty food-processing industries increased their total production 2.9 percent in constant dollars to $41 billion in 1988.

Canned goods producers accounted for 64 percent of the total value of industry shipments in 1988 and last year, canned foods grew 2.5 percent in constant dollars thanks to the growth in jarred ethnic foods, baby foods and sauces. Canned and jarred products received a shot in the arm from the upsurge of interest in Italian sauces and Hispanic foods (see the February issue of *Food Engineering*, page 73). However, the popularity of basic canned fruits and vegetables is declining since consumers increasingly prefer fresh or frozen foods.

Soups boiled with activity in 1988, as drysoups ladled almost 30 percent of the soup market in 1988. This represents more than twice the share the category enjoyed a decade earlier. The demand for prepared soups and other microwavable products is also increasing in response to the changing needs of a society with limited time for meal preparation.

Aseptically packaged juices were strong in 1988, with children becoming number one consumers of boxed juices.

The rocketing appeal of boxed juices has helped reverse the downward trend in per capita consumption that has plagued the canned juice industry since the 1970s. Per capita consumption of canned juice in 1988 was estimated to be eight gallons, up from seven gallons in 1985.

In 1988, the estimated current-dollar value of shipments by the frozen food industry rose by 3.8 percent. The demand for frozen convenience foods has benefited from the jump in the proportion of U.S. households that have microwave ovens from ten percent in 1976 to 60 percent in 1987. Microwave ovens are now also found in almost 60 percent of all workplaces.

Specialty desserts grew only two percent, down from a hefty five percent annual growth between 1982 and 1987. While the demand for frozen baked goods and low-calorie items has increased, the popularity of frozen entrees has leveled off. Currently, more than a third of U.S. households purchased low-calorie entrees in 1988, up from 25 percent in 1986.

The value of shipments by the meat and meat products industries rose an estimated 1.2 percent (adjusted for inflation), with red meat shipments less than 1 percent in 1988.

Constant dollar industry shipments of red meats are expected to increase less than one percent. Beef production will continue to decline in 1989, while pork production will reach a plateau in early 1989. Overall, per capita beef consumption will fall to under 72 pounds, while per capita pork consumption at best will remain at about

Circle 12 or see FEM, p. 363 →

62 pounds, according to Commerce Department estimates.

For the second year in a row, more poultry was eaten than beef. Between 1987 and 1988, per capita consumption of poultry increased 5.9 percent to 82.5 pounds. This trend away from red meat on the part of consumers is further evident by the increased percentage of poultry consumed, 37 percent in 1988, compared to 26 percent in 1977. Per capita consumption of beef dropped 3.4 percent during the same period.

Since the trend in beef consumption per capita is not expected to reverse, more and more meat packers are shifting away from commodity products and moving into brand name and other value-added items. In 1988 boxed beef, which constituted only 46 percent in 1979, accounted for 85 percent of total beef consumed.

The Department of Commerce has predicted that the meat-packing industry will continue to improve profitability through product innovations and closing of inefficient plants. The number of federally inspected meat plants declined 12.2 percent between 1985 and 1987, and a further decline is expected for 1988. It appears that more red meat companies are expanding into the poultry business and vice versa. Between 1985 and 1987, establishments requiring both federal meat and poultry inspection grew 11 percent, to 3,270 plants.

U.S. shipments of poultry and related products rose 2.6 percent to $12.6 billion in 1988. The poultry industry has benefited from rising demand for attractively priced frozen dinner entrees and other convenience foods. As a result, per capita consumption of poultry increased from 53.2 pounds in 1977 to 82.5 pounds in 1988. However, profit margins have suffered because of oversupply, according to the Department of Commerce.

The poultry industry, although outpacing the red meat industry, will experience only a 1.7 percent growth in constant-dollar value of shipments. Poultry processors are expected to continue to offer consumers new poultry products in response to consumers' demands for convenience and variety.

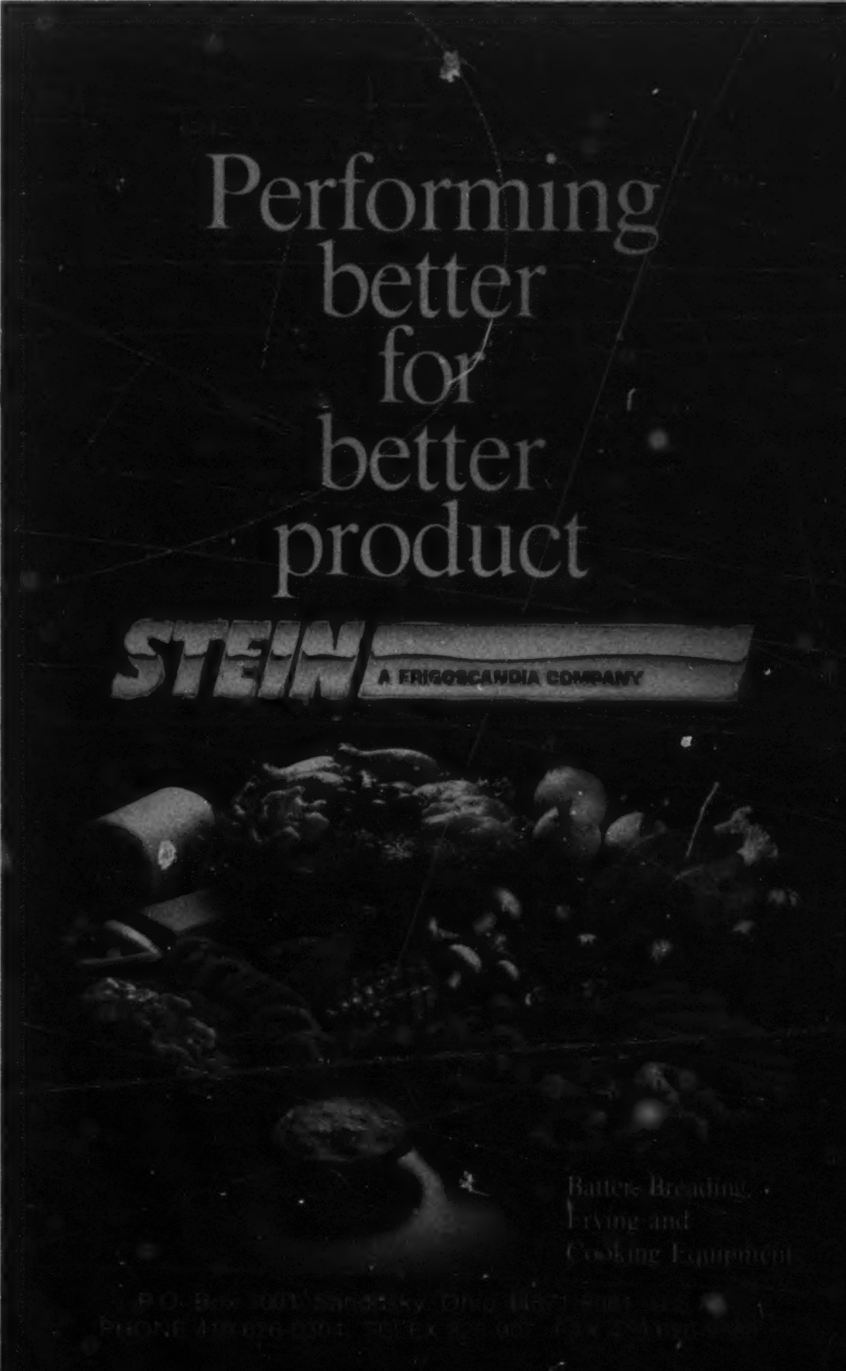
There will be a continual quest for leaner meats, the Department of Commerce predicts. By manipulating animal hormones, food scientists might be able to reduce fat by 50 percent, the Department of Commerce adds. This potential development could save the meat industry about $2 billion in feed costs alone.

Red meat consumption is expected to continue its downward trend between 1989 and 1993.

Processed fishery products continue to reel in profits with a 1.5 percent increase in the value of shipments over 1987. The seafood industry is in the enviable position of being able to sell more and more of its products at even higher prices, according to the Commerce Department.

Copies of the 1989 U.S. Industrial Outlook are available for $24 pre-paid by contacting the Government Printing Office, Washington, DC 20402-9325.

Circle 13 or see FEM, p. 373→



FOOD ENGINEERING'S
EXECUTIVE
ADVISORY
PANEL

CAPITAL SPENDING '89

EQUIPMENT BUYERS SURVEY

Our Executive Advisory Panel takes a look at 1989 and shares its thoughts on budgets, equipment purchases and production projections.

Food Engineering's most recent survey of its Executive Advisory Panel found an industry almost universally optimistic as it enters the 1990s, and willing to exhibit that optimism by projecting healthy expenditures during 1989.

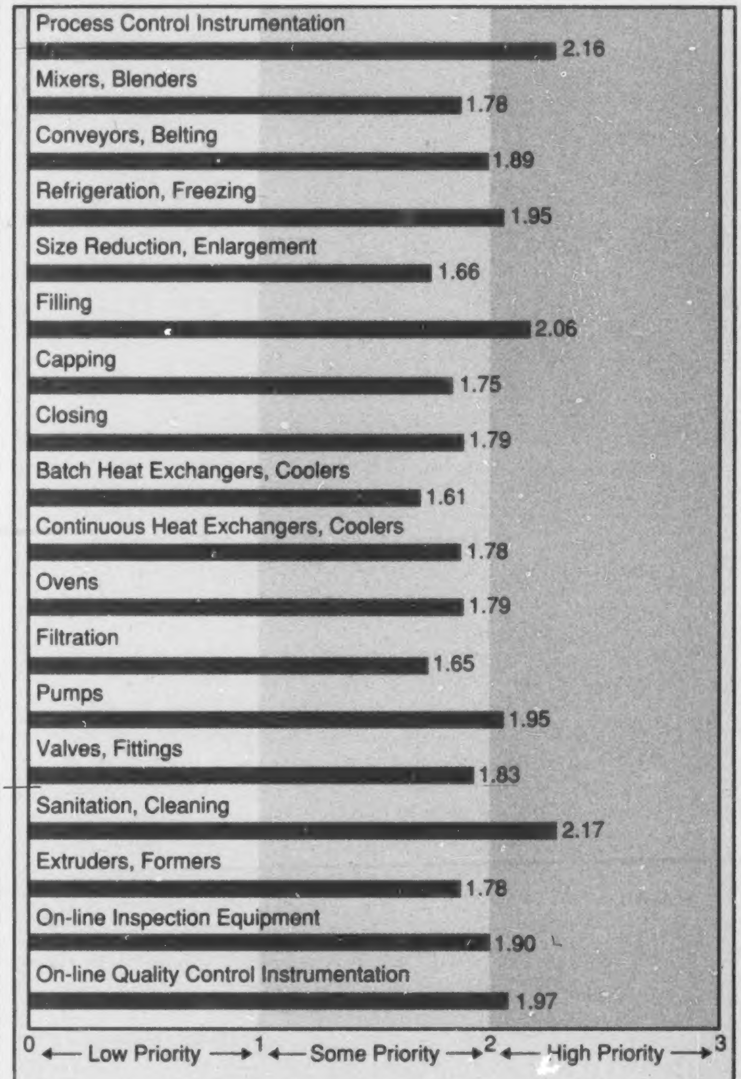
"Generally, sales look good, profits look steady to improving. The food industry appears to remain one of the brighter spots in American industry," said one panel member.

Some of the good "vibes" come from knowing that companies have streamlined their operations for greater productivity and profitability. Others point to expansion programs in progress or completed which will permit them enhanced manufacturing capability to meet demand. Others are finding management more receptive to new ideas and new products. Some are finding acceptance of their brand name to be the key to success this year in a marketplace where competition remains keen.

The optimism, however, is not unanimous. Those who view 1989 as a "tough year" are doing so for some of the same reasons that others feel optimistic: for example, seeing the continuing flood of new products as a hindrance, not a help, to success. Although one optimistic respondent feels the "American business spirit is alive and well—we are rising to the challenge," another reflects a more downbeat view saying the industry should "tighten its belt for a rough

LINDA K. FREEMAN
Contributing Editor

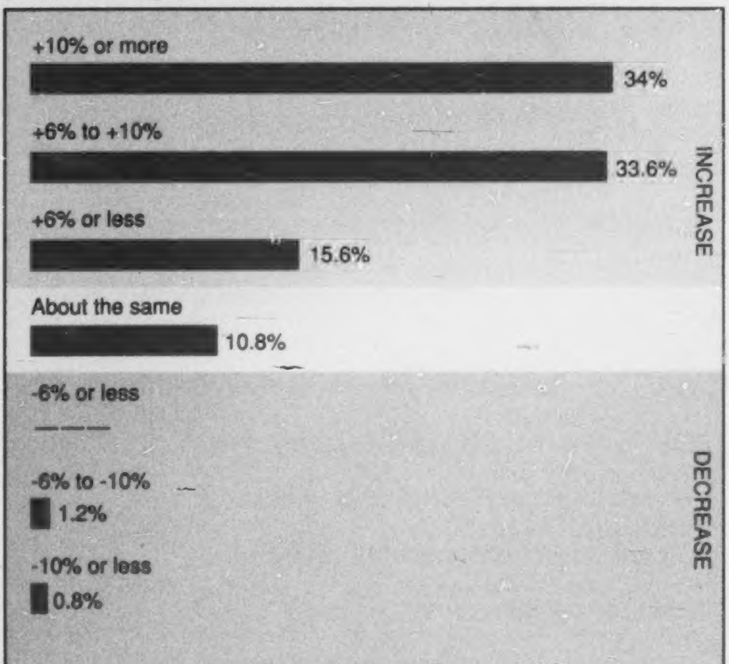
PURCHASE PRIORITY — 1989
(ratings show what respondent priorities were for equipment indicated)



Source: Food Engineering Executive Advisory Panel.

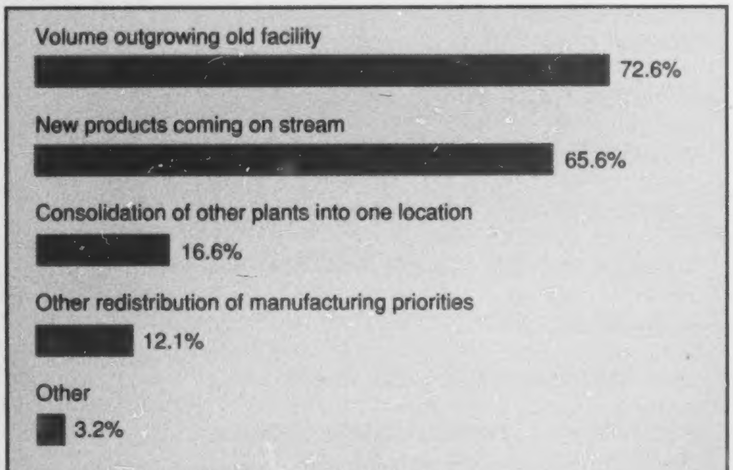
PRODUCTION INCREASE/DECREASE 1988-1989

(numbers reflect panel estimates)



Source: Food Engineering Executive Advisory Panel.

Respondents were asked for the reasons for recent or planned expansion.



Total exceeds 100% due to multiple answers.

Source: Food Engineering Executive Advisory Panel.

one—lots of new products vying for little shelf space." A number of respondents view competition as a real problem. "And I thought 1988 looked like a rough year!" said one, "1989 promises to be a son of a gun for sure."

Some of the pessimism of the panel is based on concern about the continued "mergermania" within the industry. "Leveraged buy-out and possible breakup of business units will doubtless have a large and currently unpredictable effect on our company," said one. "Heightened focus on short-term profits due to the current takeover environment has restricted capital project funding to only include essential or very fast payback projects (less than six months)," said another.

Budgets are healthy

Still, for whatever caution there may be, almost across the board sizable amounts of capital are available for purchases.

Looking at the figures themselves (see chart labelled "Budgeting"), a significant portion of capital expenditures is projected to fall in the $4 million or more category, certainly not a sign of caution or pessimism.

One of the reasons for projections of substantial capital outlays is that 34 percent of our panel respondents foresee a 10 percent or more increase in production, and another 33.6 percent see a 6-10 percent increase. "We plan on growing by the addition of new products and increased sales in present lines," says one panel member.

Others are expanding into new markets, both national and international, heightening their expectations of success, and raising the need for enhanced production capabilities.

A significant percentage of respondents expected slightly higher levels of manufacturing capabilities to come online between 1988 and 1990 than during the previous two year period. If you use the panel's responses as a barometer for the industry, bakery products and dairy products show the greatest projected rise in manufacturing space. Canned fruits/vegetables/entrees, fats and oils and confectionery are projecting slight decreases. The rest of the food industry segments say they're looking at smaller percentage increases.

The amount of expansion planned or already implemented ranged across the board (see chart), with the heaviest concentrations coming in the 10-30,000 square foot brackets, but a surprising amount of expansion is expected to exceed 100,000 square feet.

Volume outgrowing present facility capa-

If manufacturing space was/will be expanded from 1987-1990, approximately how many square feet?

Less than 10,000	21.0%
10,000-19,999	12.1
20,000-29,999	10.8
30,000-39,999	4.5
40,000-49,999	3.2
50,000-59,999	7.6
60,000-69,999	0.6
70,000-79,999	1.9
80,000-89,999	1.3
90,000-99,999	0.0
100,000 or more	10.2

Source: Food Engineering Executive Advisory Panel.

bility was the number one reason cited for recent or planned expansion. An amazing 72.6 percent cited increased volume, while 65.6 percent said increased manufacturing space was needed to handle the number of new products coming onstream.

These percentages reflect the optimism of the panel. One respondent felt expansion was necessary in order to achieve "good production to meet sales and to avoid shipping delays. Projected and approved expansions will accomplish this goal." Others see expansion as the key to offering "more value added products, such as mixes, formed products, pre-cooked, etc."

Not everyone was adding more manufacturing space, but responses to *Food Engineering*'s queries showed a high level of activity across the industry in retrofitting and rehabbing work being done to older, outdated manufacturing space. Updating facilities and equipment is far easier on the capital budget than building a totally new facility or production area.

More than 74 percent of the respondents related company retro/rehab activities to the "need for greater productivity." Another 57.6 percent cited "replacement of outdated technology" as the reason, while 50.3 percent said the drive for greater automation sparked the rehab/retro work. Several respondents voiced the opinion that there should be "more sympathy and emphasis put on upgrading present operations to improve productivity, rather than installation of new, untested equipment."

Arriving at the decisions to install new equipment, or rehabilitate the present

BUDGETING, 1989, BY SEGMENT

(dollar figures reflect company-wide equipment budgets for fiscal 1989)

	Under 50K	50-99K	100-249K	250-499K	500-999K	1-1.9M	2-3.9M	4+ M
Meat Products	9.8%	8.2%	9.8%	1.6%	11.5%	16.4%	6.6%	27.9%
Bakery Products	15.8	5.3	8.8	10.5	3.5	14.0	7.0	28.1
Dairy Products	9.3	8.0	6.7	9.3	8.0	9.3	9.3	34.7
Flavors/Food Ingredients	15.4	13.8	13.8	9.2	7.7	9.2	6.2	15.4
Canned Fruit/ Veg/Entrees	4.8	2.4	9.5	4.8	7.1	19.0	4.8	42.9
Fats & Oils	16.3	2.3	16.3	9.3	9.3	9.3	4.7	27.9
Frozen Fruit/ Veg/Entrees	12.8	7.7	5.1	5.1	2.6	15.4	7.7	38.5
Confectionery Products	10.9	4.3	15.2	4.3	10.9	8.7	8.7	28.3
Cereals/Grain Products	9.5	6.3	9.5	6.3	4.8	11.1	6.3	33.3
Beverages	10.0	6.7	10.0	5.0	6.7	11.7	5.0	38.3
Other	14.1	1.4	14.1	7.0	5.6	12.7	12.7	23.9

Percentages may not add up to 100% because of multiple responses or partial responses.
Source: Food Engineering Executive Advisory Panel.

Respondents were asked if their location had expanded manufacturing space in the last two years — 1987, 1988. And, if their location is planning an expansion in the next two years.

	1987-1988		1989-1990	
	Yes	No	Yes	No
Meat Products	42.6%	54.1%	45.9%	49.2%
Bakery Products	43.9	52.6	54.4	42.1
Dairy Products	45.3	52.0	54.7	42.7
Flavors/Food Ingredients	47.7	50.8	49.2	49.2
Canned Fruit/Veg/Entrees	42.9	52.4	40.5	54.8
Fats & Oils	44.2	53.5	41.9	55.8
Frozen Fruit/Veg/Entrees	41.0	53.8	43.6	51.3
Confectionery Products	41.3	52.2	39.1	52.2
Cereals/Grain Products	55.6	42.9	55.6	42.9
Beverages	48.3	48.3	50.0	46.7
Other	56.3	42.3	49.3	49.3

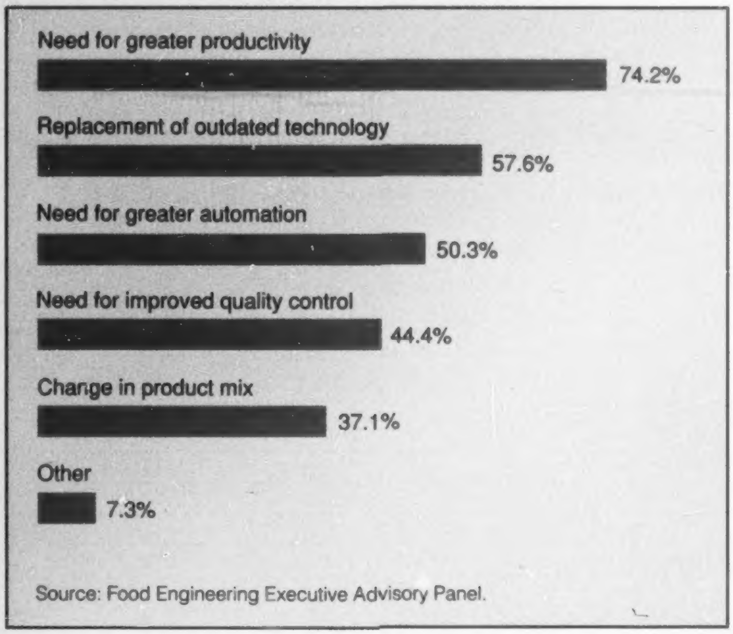
Percentages may not add up to 100% because of multiple responses or partial responses.
Source: Food Engineering Executive Advisory Panel.

Respondents were asked if their location had been retrofitted/re-habbed from 1987-1989? And is their location planning a retrofit/re-hab from 1989-1990?

	1987-1988		1989-1990	
	Yes	No	Yes	No
Meat Products	42.6%	49.2%	49.1%	50.9%
Bakery Products	40.4	52.6	42.3	57.7
Dairy Products	52.0	42.7	54.3	45.7
Flavors/Food Ingredients	49.2	49.2	44.3	55.7
Canned Fruit/Veg/Entrees	38.1	54.8	38.5	61.5
Fats & Oils	48.8	46.5	47.5	52.5
Frozen Fruit/Veg/Entrees	43.6	43.6	45.5	54.5
Confectionery Products	45.7	45.7	38.5	61.5
Cereals/Grain Products	57.1	38.1	58.3	41.7
Beverages	48.3	43.3	38.2	61.8
Other	42.3	54.9	38.8	61.2

Percentages may not add up to 100% because of multiple responses or partial responses.
Source: Food Engineering Executive Advisory Panel.

Reasons for recent or planned retrofit/rehab.



Source: Food Engineering Executive Advisory Panel.

manufacturing space, both of which are capital intensive, is often a lengthy and complex procedure. A significant percentage of respondents feel that communication is a large problem in handling capital projects—communication between engineering and the project implementer, between levels of project management, and between various groups at different locations and different plants. Many felt more input from line and production workers was necessary and many felt that more people should be involved in the decisions, including research and development, technical services, packaging engineers, etc. so that consensus decisions could be reached.

Tied into communication was the desire for better planning. "We need to start one to two years ahead," says one respondent. A task force approach was recommended to provide "longer-term planning, with expedient short-term project completion." Long-range plans, it was suggested, should be discussed with top supervisors, again toward the goal of consensus decisions. Part of better planning, said the panel, is quicker action, quicker approval, less paperwork, and less involvement of the parent company.

The wish list

Part of each Executive Advisory Panel survey is a request for respondents to tell us what need or want is currently unfulfilled in available food industry equipment and technology.

This year, by far the longest wish list is for improvements in inspection systems, including:

- A piece of equipment able to inspect the integrity of a heat seal of a blister pouch as they are being produced at 200+ per minute.
- On-line seal integrity testing for heat-sealed, retortable containers.
- High speed in-line container leak or seal integrity testing for foil sealed containers.
- Absolute leak detection for plastic containers.
- Automatic inspection of filled cans to detect missing covers, knocked down flanges, or other problems in sealing.

Also high on the priority list is a broad range of detection equipment to detect metal and the presence of other "foreign bodies" and the need for more flexible, "more human" robots (especially a concern of our meat industry respondents).

More sophisticated moisture measurement equipment was another request of a number of respondents, as were more flexible case packer and cartoning equipment to handle more difficult containers and provide a broader range of task fulfillment.

The food industry survived the stock market debacle of '87 and has survived the continuing drive for mergers and acquisitions to arrive optimistic and financially healthy at the doorway to the 1990s.

Special Emphasis

SITE SELECTION

HIGH-TECH SYSTEMS KEY TO SITE CHOICE

Location and quality of the labor force are still the key factors in site selection, but the integration of advanced manufacturing systems such as CIM and JIT is becoming increasingly important.

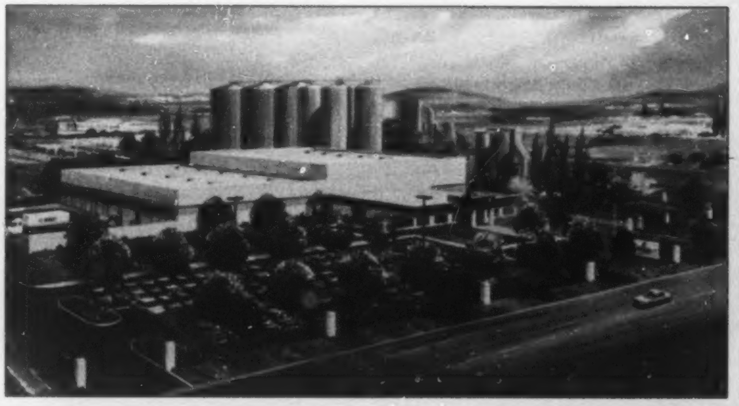
The corporate food fights of the 1980s and the resulting mergers and acquisitions have had little effect on the number of new plants built over the last few years. In fact, *Food Engineering's* "11th Annual New Plant Survey" (November 1988, page 85) reported new plant construction up 10 percent over 1987.

Alan D. Thomas, manager of industrial engineering, Day & Zimmermann, Philadelphia, PA, says that requests from clients for site selection help have actually increased due to mergers and acquisitions. Many of the larger food companies want to construct the factory of the future and are willing to start from scratch.

Just what is this factory of the future? According to Thomas, it is the right mix of technology for a particular food plant. Most importantly, it is the integration of Computer Integrated Manufacturing (CIM) and Just-in-Time (JIT) principles. "If a plant can accomplish this integration and be close to their suppliers, they can reduce operating costs and be successful," Thomas said. (For a closer look at the impact of these technologies on site selection, see the sidebar on page 116.)

Choosing the site

Location, proximity to market, and market share (if the plant is in an expansion mode) are the three most important factors in site selection, according to Jim Loorya, director of area development for Pacific Gas and Electric, San Francisco, CA. "Once a location is decided upon, the key element is the availability of transportation. Other factors to consider are the availability of labor and if the state is a right to work state or not," Loorya said.



Close proximity to nearly 50 percent of the corn used to make its product was one of the reasons Cornnuts Inc. selected Fresno as the site for its new plant. Photo courtesy of Fresno County Economic Development Corp.

When people think of California, they usually think of world class cities like Los Angeles or San Francisco, but not all of California is expensive, according to Loorya. Other areas such as Fresno and Sacramento offer prospective food plants competitive prices for labor cost and labor availability.

For example, Cornnuts Inc. is in the process of building a 60,000 square foot manufacturing facility on 15 to 20 acres in the southern industrial area of Fresno. The facility will combine two basic production operations: a grain elevator for drying, cleaning and storage of corn, and a processing/packaging plant where the corn is turned into finished snack food product.

Before selecting Fresno, Cornnuts narrowed the choice to California, where one-third of the product is purchased and where 50 percent of the corn used for the product is grown. The company also wanted its manufacturing facility to be located near a metropolitan area that could easily provide the supplies and services required for manufacturing. Other pluses for the area included a modern waste treatment facility, large labor

JOYCE FASSL
Managing Editor

pool and proximity to two major highways, two railroad lines, and a major airport, in addition to financial incentives.

State assistance

Kathleen Miller, account executive for food processing for the Michigan Department of Commerce in Lansing, says that access to market is the overriding factor in where plants decide to locate. "If raw product is important to the food plant, they will locate near it; if emphasis is on the final product, the plant will locate near the consumer; but access to market permeates both decisions where to locate," Miller told *FE*.

Access to quality labor is also important, according to Miller, as is a favorable comparison of labor costs. The quality of productivity within the labor force is also an important consideration, since quality of labor can differ from state to state, she said.

No site selection project can be completed without working with some branch of government, be it state or county. Following are Miller's tips (presented at the Food Plants 88 conference held last October in Chicago) for working with government agencies during a site selection project.

•*Be flexible*—Don't be rigid about whether you pursue an existing building, a "green-

The impact of JIT and CIM on site selection

Advanced manufacturing technologies and philosophies such as Just-In-Time (JIT) and Computer Integrated Manufacturing (CIM) are having a tremendous impact on the site selection process. JIT principles stress the importance of proximity to suppliers, distributors and customers. CIM principles focus chiefly on using information processing to achieve total coordination throughout your company's organizational structure and operating environment.

Food processing was actually the first industry to practice JIT principles. Before refrigeration and high speed transportation, handling perishable ingredients and products always dictated a location close to the market and supplier.

CIM, on the other hand, has not been as widely adopted among food processors, perhaps because of a lack of understanding of what CIM really is.

Alan D. Thomas, manager of industrial engineering at Day & Zimmermann, Inc., Philadelphia, PA, believes CIM is more of an operating philosophy than a new technology.

"CIM is as much a management issue as it is a hardware or software issue—maybe even more so," he said. "It is the sharing of information throughout every operation and department of the company to achieve an established set of business goals."

"For example, if the sales department's goal is to sell 5 million chocolate wafers and 5 million vanilla, the plant must have the flexibility to achieve this product mix," Thomas said. "Merely being able to produce 10 million wafers would not achieve the same market results."

CIM addresses not only the processing/manufacturing operation but the entire business of processing, which includes product and process design, processing, distribution through aftersale service and support. This demands that every person and equipment type be integrated from process control through corporate management to achieve the same set of shared goals.

How do JIT and CIM principles affect site selection? In the traditional site selection process, the most important criterion is usually the projected cost to acquire, build and operate the facility. The selected site should also provide employees with a satisfying quality of life, community services and a comfortable cost of living. Land cost, utility costs, environmental regulations, topography, geotechnical conditions and other factors are established, and their level of importance to the company is determined and weighed. Data is then collected, and after a comprehensive investigation, the factors are scored to establish a relative rank of the analyzed sites.

"A JIT approach coordinates activities so that the ingredients and materials to make a product are immediately available when needed and the resources required to perform every step of production are in place," he says.

JIT impacts the site selection process by influencing labor and management relations, the level of automation, and required storage space. Thomas defines JIT as the elimination of waste from the process, where waste is all activities that add cost but not value to the product.

In the analysis process, he advises first identifying activities that are considered waste and then eliminating them. Examples: transportation of raw material to the production facility and from the plant to the ultimate customer; storage of raw material, work-in-process and finished product; and inspection of incoming raw material and outgoing finished product. Total costs can be minimized by eliminating the need to perform these activities.

"Ideally, this would mean building a facility *next* to your suppliers and customer, designed for 100 percent reliable product and process quality," explains Thomas.

He emphasizes, however, that locating close to suppliers is a goal of JIT that has several advantages. It makes a greater number of smaller shipments of raw material cost-effective and reduces storage requirements. In addition to reducing operating costs, it fosters a close working relationship with vendors.

JIT may imply a culture change to some U.S. food processors. The JIT environment emphasizes a culture where management and labor work together in harmony to continually solve problems and improve the operation.

"It's important to find a location where people are open to accepting new ideas and operating environfield" site, or geographic boundaries. You may eliminate some desirable options just into the next county. Some economic developers may be aware of private developers who will build and then lease you the site.

- *Be clear about your priorities*—The clearer you can be about the importance of the various factors in locating a plant, the more valuable state assistance will be to you. If waste water treatment is a major operations cost and problem, and consequently, a municipal hookup is critical, then indicate that. The developer can start with that factor and save you time. Then the other factors you've identified can be added according to your priorities.
- *Don't be afraid of confidentiality*—Most state government economic developers can and will work on a confidential project. The Freedom of Information Act is seldom used and is usually too time consuming.
- *Allow direct access to decision makers*—If you use a consulting firm to represent you, allow direct conversations with your company even if you don't give the name. Letting the consultant convey your priorities and answer questions about your specific needs may result in misunderstandings and incomplete information for this important decision.

Strategic business goals help you focus in on the site selection process. CIM and JIT principles help define and clarify your needs.

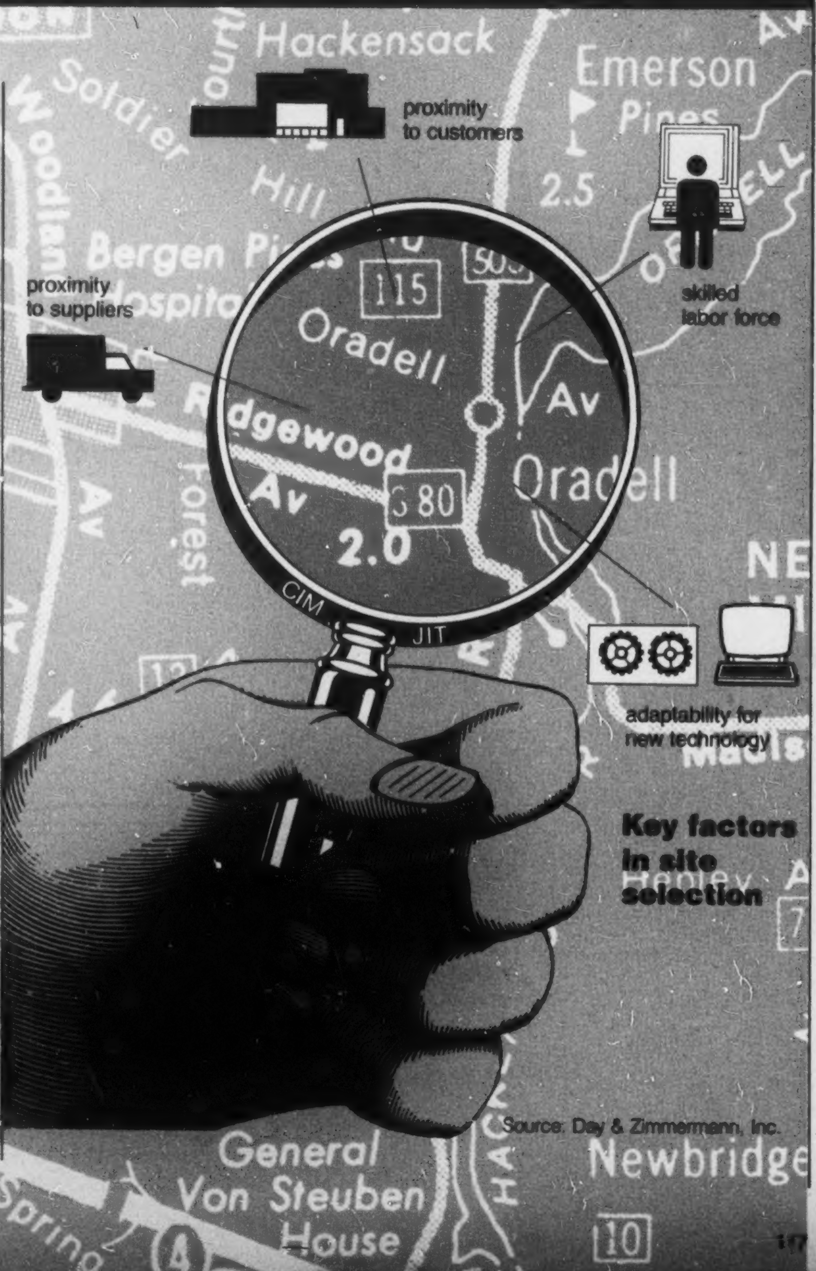
ments," notes Thomas, "because job responsibilities will be expanded to achieve a flexible, cross trained workforce."

Just by relocating and establishing a new operation, a new working culture will develop. But, both management and workers must be trained to encourage communication. This requires the development of an effective management team to lead the business. The selected site should be in a marketplace that has or can attract such individuals.

CIM affects the same factors in the site selection process—but in a different way. CIM integrates the operation through a change of culture, similar to JIT but with more reliance on on-line, real-time information processing. The key is integration using state-of-the-art systems.

Site selection following the principles of JIT and CIM encompasses many intangible considerations in addition to the traditional, easily measured criteria. The starting point is identifying your business goals and determining the level of technology and combination of resources needed to support this corporate mission.

Alan D. Thomas is manager of industrial engineering at Day & Zimmermann, an engineering firm headquartered in Philadelphia, where he oversees a full range of facilities planning and modernization services for the food industry. He was previously manufacturing consulting manager at a "Big 8" professional services firm.



Key factors in site selection

Source: Day & Zimmermann, Inc.

Comparative annual operating cost analysis for [illegible] food industry locations

	Chicago Metro Area	San Francisco Metro Area	Denver Metro Area	Kansas City Metro Area	Omaha Metro Area	Minneapolis Metro Area	Milwaukee Metro Area	Sioux Falls Metro Area
Nonexempt Labor Weighted Average Hourly Earnings	$10.54	$12.65	$10.75	$10.96	$10.33	$11.07	$11.38	$8.01
Annual Base Payroll Costs ($1,000)	$3,713	$4,456	$3,787	$3,861	$3,639	$3,899	$4,008	$2,821
Fringe Benefits ($1,000)	$1,374	$1,649	$1,401	$1,429	$1,346	$1,443	$1,483	$1,044
Total Annual Labor Costs ($1,000)	$5,087	$6,105	$5,188	$5,290	$4,985	$5,342	$5,491	$3,865
Electric Power Costs ($1,000)	$330	$312	$256	$298	$210	$197	$271	$207
Natural Gas Power Costs ($1,000)	$482	$338	$417	$383	$294	$267	$430	$271
Occupancy Costs ($1,000) Amortization	$1,925	$2,075	$1,821	$1,878	$1,793	$1,915	$1,868	$1,727
Property Tax Cost	$630	$116	$181	$200	$206	$440	$318	$175
Heating and Air Conditioning	$178	$76	$127	$139	$110	$133	$165	$135
Total Occupancy Costs ($1,000)	$2,733	$2,267	$2,129	$2,217	$2,109	$2,488	$2,351	$2,037
Transportation Costs($1,000)	$868	$1,356	$881	$795	$810	$924	$877	$891
Total Annual Geographically-Variable Operating Costs ($1,000)	$9,500	$10,378	$8,871	$8,983	$8,408	$9,218	$9,420	$7,271

Figures include all major geographically-variable operating costs based on 1987 U.S. dollars. Start-up and relocation costs are not included.

Source: The Boyd Company, Princeton, NJ.

Food industry operating costs in major U.S. markets were compiled for a study conducted by The Boyd Company, location consultants.

- *Work with both state and local development offices* – State officials are trained to know how their state compares to others and what state assistance programs are available. Local officials are trained to know local services and incentive programs and local assets for your company. Singularly they provide only half the picture, together they provide the whole picture.
- *Don't underestimate the assistance you can get from government* – State governments are getting creative in their assistance. Don't hesitate to ask for assistance they do not traditionally provide. In addition to the types described above, you may also be able to get information about university assistance programs and agricultural production.

Cost comparison

Location consultants and design and construction engineering firms can offer potential clients cost comparisons of sites across the nation (see chart above). After a client has considered all the choices – utilities, taxes, labor, transportation – he or she can choose the site with the best bottom line.

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FOOD
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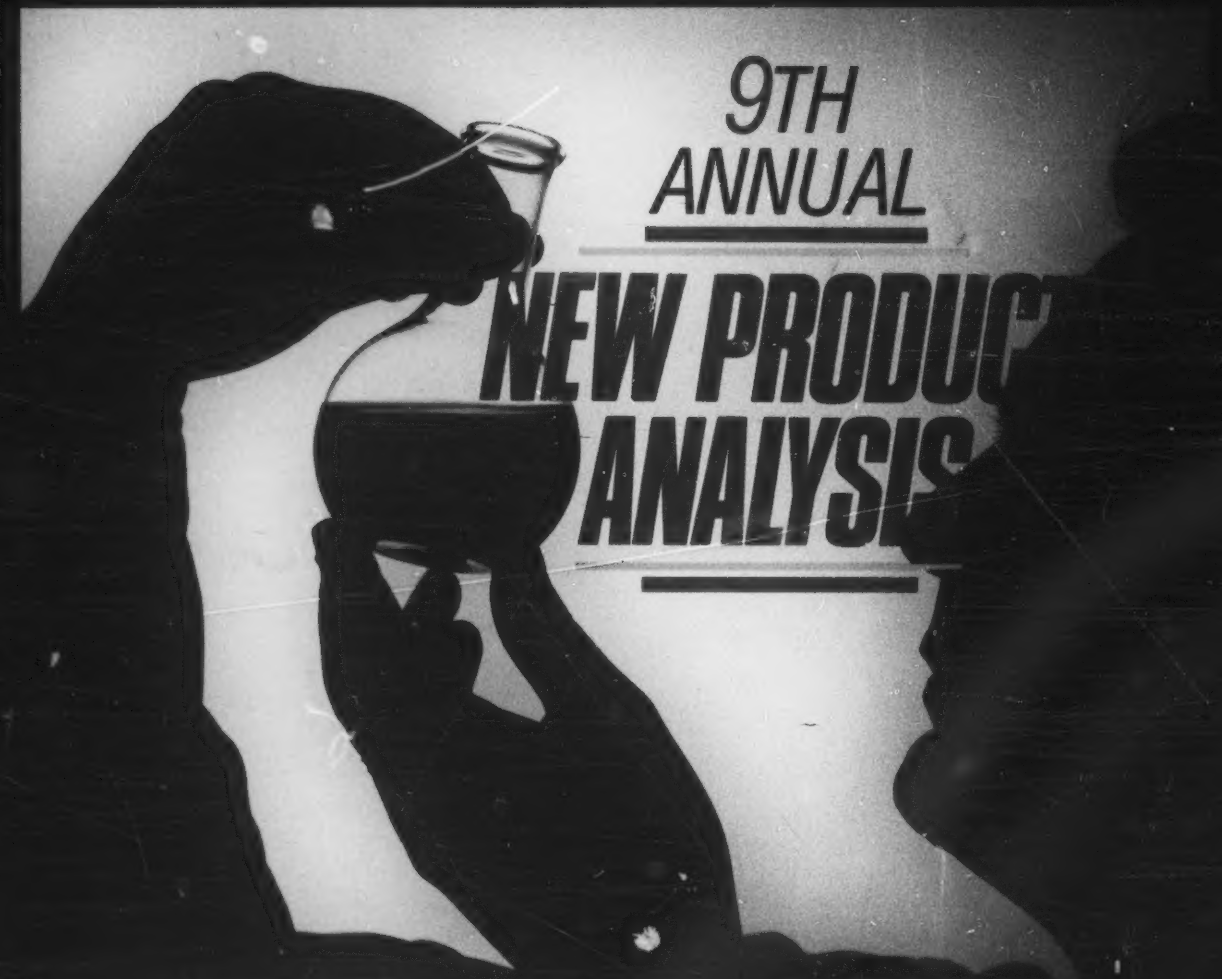
SINCE 1928, THE SOURCE ON PROCESSING, PACKAGING, AND PRODUCT DEVELOPMENT



9TH
ANNUAL

NEW PRODUC
ANALYSIS

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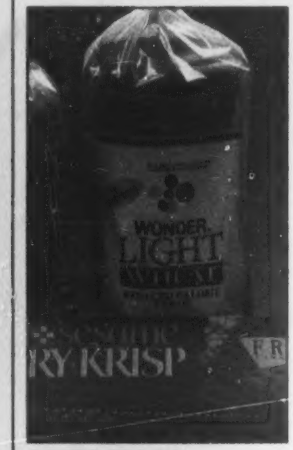

COVER STORY

Food Engineering's ninth annual "New Product Analysis" shows that new food introductions are slowing down. And many of the introductions are merely line extensions or new sizes.

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15 Industry Report
This month's Report talks about the debate over whether food labels should reflect dietary advice from the government; survey results from dairy processors on the future of the food industry; research in microwave technology that could cut manufacturing costs; and plans for the 1989 Dairy & Food Expo to surpass the 1987 show.

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Often overlooked in importance, valves are a vital, integral part of the processing cycle.

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Special Emphasis

VALVES AND VALVE CONTROLS

Valves in a food or beverage plant are like paperclips in the office—they're everywhere! But specifying specific valves for individual uses involves a lot more than choosing the right paperclip.

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1988 food and beverage introductions

Foods	Total Intros.	New Brand	Line ext. w/in brand	Other (i.e new package)	Total SKUs
Baby food	19	5	-	14	69
Fruits	43	9	1	33	70
Vegetables	98	23	5	70	227
Pasta products & combos	60	12	1	47	154
Rice & rice combos	35	5	-	30	84
Prepared salads	17	2	2	13	47
Bread & bread products	128	41	4	83	363
Pastry & baked products	95	23	2	70	264
Cake mixes & cake frosting mixes	18	5	-	13	44
All other baking mixes	31	5	3	24	57
Desserts	24	6	-	18	65
Chocolate candies	90	28	2	60	292
Non-chocolate candies	79	20	1	58	211
Chewing gum	19	2	1	16	34
Cookies	130	38	2	90	289
Crackers	51	9	-	42	86
Chips	95	23	-	72	159
Popcorn	40	9	2	29	90
Nuts & seeds	33	11	3	19	103
Snack bars	21	3	2	16	37
Other snacks	77	17	2	58	233
Meat	83	20	-	63	164
Fish	32	8	-	24	80
Poultry	59	10	-	49	102
Vegetable protein products	21	9	-	12	65
Meals & entrees	140	43	3	94	330
Entree mixes	18	6	-	12	37
Meat meals & entrees	82	23	1	58	163
Fish meals & entrees	25	5	-	20	65
Poultry meals & entrees	60	4	1	55	94
Vegetable meals & entrees	16	3	-	13	39
Cereals	90	9	2	79	142
Ice cream & ice cream cones	135	39	7	89	432
Cheese	73	19	2	52	191
Margarine, butter, etc	16	4	-	12	22
Other non-beverage dairy case products	14	9	-	5	26
Dairy substitutes	11	4	-	7	23
Yogurt & yogurt imitations	37	13	-	24	133
Sweet toppings	49	16	3	30	121
Jams, jellies, marmalades, sweet butters	42	15	1	26	195
Nut butters	18	3	1	14	49
Savoury spreads	18	6	-	12	104
Soup	45	11	2	32	111
Oil & shortening	23	6	1	16	51
Pickles, relishes, olives, chutney, etc.	45	7	1	37	132
Catsup	9	2	-	7	10
Mustard	36	7	1	28	67
Spaghetti sauce & other pasta sauces	29	6	-	23	61
Other sauces, gravies & condiments	131	38	6	87	306
Mayonnaise & imitation mayonnaise	4	-	-	4	13
Salad dressings	59	11	4	44	129
Salad toppings & dips	24	4	1	19	43
Spices, extracts & seasonings	127	47	2	78	407
Staples	28	3	2	23	49
Special diet foods	26	6	-	20	68
Miscellaneous foods	1	1	-	-	1
Beverages					
Wine & wine coolers	63	15	-	48	149
Beer & ale	63	14	1	48	94
Liqueurs	14	4	-	10	38
Other alcohol	21	3	1	17	33
Alcohol beverage substitues, low alcohol	4	2	-	2	5
Cocktail mixes	5	1	-	4	7
Mineral water & bottled water	39	26	-	13	120
Miscellaneous soft drinks	89	19	1	69	252
Isotonic, energy producing beverages	15	3	-	12	39
Health drinks	12	3	1	8	35
Fruit & fruit flavored	120	28	3	89	374
Vegetable & vegetable flavored	8	-	1	7	12
Baby beverages	6	-	-	6	15
Milk & non-dairy milk	31	15	1	15	68
Milk additives	10	3	1	6	22
Tea	53	15	-	38	169
Coffee	32	9	2	21	87
Beverage mixes & bases	26	11	1	14	67
Total	3440	884	87	2470	8589

Source: Productscan™/Marketing Intelligence Service

Food manufacturers are beginning to heed their own warnings that too many new foods are being introduced. New food and beverage introductions for 1988 totaled 3,440, or 141 less than in 1987 when a record high of 3,581 new foods and beverages entered the market.

The rising costs of new food introductions not only played a role in slowing down new entries, it also contributed to a greater percent of new food and beverages coming from major manufacturers. According to Marketing Intelligence Service's Productscan™, the top 20 companies in food and beverage introductions accounted for 20.9 percent of the total introductions in 1988, as compared to 17.8 percent in 1987.

"Introductions were still rising sharply through the first half of 1988, but we think marketers have become more cautious due to the impact of excessive numbers of introductions and continued high rates of failure, concerns about economic slowdown, and the high cost of slotting fees charges by distributors," explained Richard Lawrence, president of Marketing Intelligence Service, a marketing research firm located in Naples, NY. "Successful new products continue to be vital to corporate growth in mature markets but marketers are giving ideas harsher scrutiny, doing more upfront testing, and aiming to put fewer, but better new products into the marketplace."

This climate of caution is also seen in the relatively small proportion of new brands being launched. Marketing Intelligence reports that 71 percent of introductions were not really new but only new sizes, flavors, varieties, and kinds of existing products.

Campbell Soup Company introduced 47 new products in 1988 as compared to 48 in 1987. Speaking at the annual Frozen Food Convention in Chicago on October 10, 1988, Campbell's President and CEO, R. Gordon McGovern said, "What is emerging in today's frozen food marketplace is the limited number of eating patterns most people lock into. Their minds and palates do not want to consider 200 esoteric choices each night. They don't want that kind of decision and risk-taking...We are settling out of the blizzard of new product explorations of the past 5 or 10 years. The retailers didn't opt for much more space. The consumers didn't opt for much range. Economics dictates the solution."

McGovern also said that marketing strategies should revolve around a limited set of core brand items which will be heavily supported both in the trade and to the consumer. Heavy support of new products is becoming more important as space for new products in supermarkets becomes more scarce.

A company which has had much experience with new products is General Foods USA (GF USA), which is one of the units of the newly formed Kraft General Foods, the food division of Philip Morris Companies, Inc. (In 1988, Philip Morris introduced the most new food products and Kraft Inc. was fourth. Philip Morris purchased Kraft in October of 1988.)

"Different food manufacturers have different success rates for new products," David J. Driscoll, V.P. of strategic planning, General Foods USA, told *Food Engineering*. "We have a very good reputation, and since the trade knows we'll provide strong support for new products they are more receptive to us."

Business units within General Foods USA are run by general managers who are responsible for meeting consumers' needs in their areas of expertise. If there is current dissatisfaction within that area, a new product may be initiated. Investment for new products shows up in a business unit's strategic five-year plan and annual operating budget, which is approved by the CEO of GF USA. Several of the considerations in new product planning are: whether there will be enough growth from new product activity to meet total growth plans with an affordable investment; what categories have the greatest growth potential; and seeking a balanced development portfolio or near-end and long-term projects.

Driscoll also mentioned the importance of strengthening core businesses. "It is more likely a decision will be made between two potential new products rather than between new product support and core business support," he explained.

It's no surprise that food companies have become more market driven. But at the same time demographic and social changes have made consumer markets in the U.S. more segmented and more difficult to predict.

"An essential element for more efficient marketing is a deeper understanding of the consumers," stated an article in *Advertising Age*, November 9, 1988, p.130. "Such understanding is rarely achieved but is, in fact, an ongoing process as consumer trends unfold and the American family changes in size and character."

The desire for convenience remains the major driving force in new food and beverage introductions. But many new foods and beverages are also reflecting Americans' increased concern for their health. Quality, though, is also increasing in importance. If consumers pay for quality, they expect it. Premium frozen entrees are losing momentum, yet sales of more expensive refrigerated prepared foods are growing.

In the frozen food area, current growth areas are microwaveable hamburgers and other sandwiches, and foods that offer nutritional benefits such as reduced-calorie entrees. Other niche areas showing promise are foods specifically marketed for children, and gourmet pet foods. And after all is said and done, Americans do like to reward themselves, so categories such as premium desserts, snacks, cookies, crackers have also been active.

Frozen, microwaveable

Although consumers continue to crave easy-to-prepare foods, meeting this demand

1988 food & beverage introductions
(top 20 companies)

		1988	1987 (rank)
1.	Philip Morris Companies, Inc.	67	75 (1)
2.	General Mills, Inc.	53	34 (9)
3.	R.J.R. Nabisco, Inc.	50	56 (2)
4.	Kraft Inc.[1]	49	55 (3)
5.	Campbell Soup Company	47	48 (4)
6.	Nestle Holdings, Inc.	44	40 (6)
	H.J. Heinz Company	44	36 (8)
8.	Unilever United States Inc.	38	41 (5)
9.	Quaker Oats Company	36	21 (12)
10.	ConAgra, Inc.	35	21 (12)
11.	Beatrice Company	32	37 (7)
12.	Pepsico, Inc.	31	*
13.	Whitman Corp. (I.C. Industries)	29	*
	The Pillsbury Company	29	*
15.	Ralston Purina Company	27	*
16.	Borden, Inc.	26	17 (17)
	Sara Lee Corporation	26	24 (11)
18.	Geo. A. Hormel & Co.	20	18 (16)
19.	The Coca-Cola Company	19	*
20.	Mars, Inc.	18	21 (12)
	Total - top 20 companies	720	638
	% of food & beverage intros.	20.9	17.8

* Not ranked in top 20

[1] In October 1988, Philip Morris Companies, Inc. purchased Kraft Inc. And on March 1, 1989, Kraft General Foods Group was formed.

Source: Productscan™/Marketing Intelligence Service alone is not enough to sustain increased sales of a food item. During the early and mid-'80s, sales of gourmet frozen entrees rose dramatically, but the growth is leveling off. Sales of frozen entrees for 1988 were $3.149 billion or a 5.2 percent rise over 1987 sales, reports SAMI/Burke, Inc., a New York City-based market research firm. This is in comparison to double digit growth earlier in the decade.

An article in the April 25, 1988 issue of *Business Week* stated, "Now the once-torrid industry is settling in for a chilly time of little or no growth and fierce fights for market share." Some of the reasons given were that premium foods are too pricey for routine family feeding, and while young high-income singles and couples over 50 were willing to try these products, repeat purchases were not occurring due to dissatisfaction with the price/value relationship.

The frozen food industry is aware of the problems they face. Campbell Soup's president, R. Gordon McGovern also stated at the National Frozen Food Convention, "I am convinced that the American public is greatly disappointed in its frozen food choices and it is only a matter of months or hours before fresh, or refrigerated, or aseptic, or nitrogen flushed products drive frozen to the wall."

This price/value relationship is responsible for consumers depending more heavily on foods prepared in restaurants, supermarket delis or take-out food stores, as well as scratch cooking, according to a study conducted by *Better Homes and Gardens* magazine. This study also reported that 50.5 percent of those responding purchased frozen dinners less often than two years previously, 14.8 percent reported purchasing frozen dinners more often and 30.9 the same amount.

Competing with take-out foods and refrigerated and shelf-stable products, successful new frozen foods need to address the desire for convenience in addition to offering good quality for the price paid.

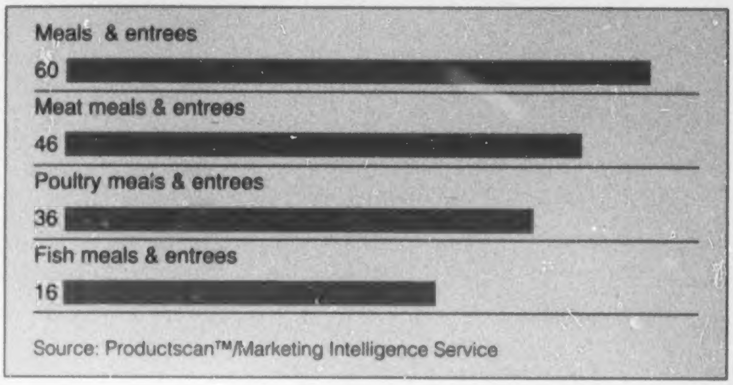
Still, while sales of frozen entrees (especially premium ones) are leveling off, it remains a huge category and one with potential in niche areas. Much has been said about the settling down of the baby boomers and about the U.S. becoming a more family oriented society as opposed to the "me" mentality prevalent earlier this decade. This has led to an increase in popularity of "home-style" products such as hamburgers, pizza and chili. But the return of women to the workplace shows no signs of reversing. This creates the need for "speedy home cooking," opening the way for frozen foods to recapture some of the sales lost to take-out establishments. The common denominators of frozen foods competing with fast food outlets are single servings or portion control, hand-to-mouth eating, and microwave oven preparation, according to Marketing Intelligence. New product introductions in this area have grown from only a few items in 1984 to over 40 in 1988.

The use of the microwave to prepared eat-on-the-run foods is apparent when one examines the types and frequency of foods purchased for microwave preparation. Business Trend Analysts (BTA), Commack, NY, conducted a survey of households which asked what types of foods are purchased for microwave preparation. Sixty-five percent purchase snacks such as popcorn, followed by 60.3 percent who purchase frozen vegetable or side dishes and 40.8 percent who purchase frozen pizza.

A study conducted by Campbell Soup Company and the Food Marketing Institute last year reported that take-out and home delivery now accounts for 15 percent of all food consumed. Many of the new frozen foods introduced in 1988 attempted to do just that. And one of the categories where food processors are battling take-out establishments is pizza. During the fall of 1988, Stouffer Foods Corp. announced that it was introducing a new line of frozen traditional-style pizzas specifically to capitalize on the growing $22 billion pizza market.

"Pizza sales are growing faster than hamburgers, chicken, fish, Mexican and other fast-food items," noted Gerald DeCroce, Stouffer's vice president of marketing. "Most of the pizza sales are now taking place outside the grocery store, and we think our traditional-style pizza product will bring the business back into the grocery stores. Our objective in creating this product line was to provide a traditional pizza that is good enough to attract pizzeria customers."

1988 frozen, microwaveable introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

Stouffer has offered a French Bread Pizza line nationally since 1979. The new traditional pizza from Stouffer comes in cheese, deluxe, pepperoni, sausage, sausage and pepperoni and extra cheese varieties.

"We've found through research interviews that there is a level of dissatisfaction with home-delivered pizzas," said Bill Biggar, marketing manager for Stouffer's Pizza. "Consumers tell us that pizza often arrives cold, and there is a general lack of consistency in quality. This information reinforces our belief that there is a strong market for a product like *Stouffer's Traditional Pizza*."

Currently, home-delivered/pizzeria pizza accounts for more than 90 percent of the category sales.

Another introduction in this category comes from Marshall, MN-based Tony's Pizza. Under its *Red Baron* label, the company added several varieties to its line of *Red Baron Deep Dish Singles Pizzas*—supreme and pepperoni. The supreme pizzas come with sausage, pepperoni, green and red peppers, onions and 100 percent real cheese. They come in a 12-ounce box with a special tray which is to be used in the microwave only.

The sandwich is another area where food processors are increasing their efforts to compete with fast food outlets. Dallas, TX-based Jimmy Dean Corp. introduced microwaveable *MiniBurgers* in regular and cheese varieties during the fall of 1988. Currently in 12 percent of the country, expanded distribution is planned.

Other new frozen, microwaveable sandwiches to appear on retail shelves during 1988 include *Chefwich Sandwiches* from Tetley, Inc., Shelton CT and *Bunch o' Crunch Microwave Fish Sandwich* from Frionor U.S.A., New Bedford, MA. Austin, MN-based Geo. A. Hormel & Co. expanded its *New Traditions* line to include chicken and fish dinner sandwiches, and the *ZAP Microwave Entree* line from Baldwin, MO-based Banquet Frozen Foods, a division of ConAgra, includes fish sandwiches and hamburgers.

Quaker Oats Company, Chicago, IL, introduced *Old Town OvenStuffs Frozen Microwaveable Sandwiches* into test market during 1988. The six varieties include two croissant-dough turnovers, two French rolls stuffed with Italian fillings and two pita-bread items. Also in this category are *Lean Pockets* from IEI of Chatsworth, CA. Chicken Oriental, chicken parmesan, and beef and broccoli are among the varieties offered.

Pizza and sandwiches are not the only areas where frozen food manufacturers are waging a battle against fast food outlets. Other heat-and-run foods being introduced to entice consumers to purchase more frozen foods fall in the poultry and breakfast categories. Frozen breakfast sales now top $500 million, according to some estimates.

The leader in this category, Campbell Soup Co. announced the expansion of its *Swanson Great Starts* frozen breakfasts with a line of microwaveable Belgian waffles and a line of microwaveable budget breakfast entrees during the spring of 1988. The waffles debuted in supermarkets in the western half of the U.S. and in Chicago, while the budget breakfasts were introduced in the eastern and southern portions of the U.S.

Developed specifically to be prepared in a microwave oven, the waffles can also be prepared in a conventional or toaster oven. Two varieties are offered—*Belgian Waffle & Sausages* and *Belgian Waffle & Strawberries in Sauce.*

The Swanson Great Starts Budget Breakfast line also consists of two varieties—*Silver Dollar Pancakes and Sausage* and *Scrambled Eggs and Home Fried Potatoes.* Both varieties can be prepared in a conventional or microwave oven, and have a suggested retail price of 99 cents per entree.

Swift-Eckrich, Inc., Oak Brook, IL, also is tempting Americans to stay home for breakfast with the 1988 introduction of *Swift Premium Brown 'N Serve Breakfast Sandwiches.* This line consists of a croissant with ham and cheese; a biscuit with sausage, egg and cheese; a croissant with bacon and egg; English muffin with sausage and egg; and individual sausage and biscuits. In announcing its breakfast sandwich line, Swift-Eckrich pointed out that this segment of the market grew 54 percent during the year pre-

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Dial Foods' Doubletree Foods brand shelf-stable Lunch Bucket entrees and soups went from 16 percent distribution in the U.S. at the beginning of 1988 to 65 percent by the end of the year.

ceding the introduction.

Geo. A. Hormel added *Steak Breakfast Sandwich* to its New Traditions line of frozen entrees during 1988. This product can be microwaved in less than five minutes or heated in a conventional oven.

In the area of poultry heat-and-run items, Pilgrim's Pride Corp., Pittsburg, TX, announced the introductions of a line of chicken-based products specifically developed for use in microwave ovens. The microwaveable products are chicken nuggets, chicken patties, hickory roasted chicken and hot'n spicy chicken wings. They are available in 75 percent of the country.

Pilgrim's Pride chicken nuggets and patties are coated with a crunchy breading and feature a browning element inside each carton. The company reports good acceptance of these products which have been on the market since April 1988.

J.R. Simplot Co., Boise, ID, introduced *MicroMagic Microwave Chicken Sandwich* and ConAgra Frozen Foods Co., Baldwin, MO, introduced *Banquet Southern Fried Chicken* during 1988 to compete with chicken fast food outlets.

A final growth area within the frozen, microwaveable category are those products with a "healthy" appeal. While the majority of these products are low-calorie entrees, Orange, CA-based All American Gourmet Company introduced *Eating Right* during 1988. This line was developed to help consumers follow the recommended U.S. Dietary Guidelines for sodium, fat and cholesterol. Eating Right was put into test market in August 1988, and the test market is currently being evaluated.

Frozen dinners and entrees are improving nutritionally according to Tufts University. An evaluation of 451 frozen dinners and entrees produced 44 products that were highly recommended and 55 only slightly short of meeting the highly recommended requirements. This compares to only 34 products being highly recommended in a similar study conducted two year earlier. A maximum of 300 calories, no more than 30 percent of calories from fat, 1,000 milligrams or less of sodium, one-third the U.S. recommended daily allowance of protein and a minimum net weight of nine ounces were some of the criteria necessary to achieve highly recommended status.

Business Trend Analysts (BTA), reported that low-calorie frozen dinners and entrees are among the fastest growing products in the industry, with sales advancing an average of 24 percent annually over the last five years. BTA predicts that this growth will continue.

Among the new low-calorie frozen entrees were Weight Watchers' *Fancy Side Dishes* from Foodways National, Inc., Boise, ID. They were introduced into Detroit, Indianapolis, Evansville, Quad Cities, St. Louis, Wichita, Grand Rapids, Fort Wayne, Chicago, Champaign, Kansas City, Springfield, Louisville/Lexington, Dayton/Cincinnati, Columbus, Miami, Orlando, Jacksonville and Tampa.

By providing foods that answer consumers' needs, manufacturers of microwaveable frozen dinners and entrees can expect growth. BTA predicts in its report, *The Markets for Microwaveable Foods*, that this category will experience an annual growth rate of 8.3 percent through 1997, reaching $7.3 billion.

Shelf-stable

Increased microwave oven ownership has been largely responsible for the existence and growth of the shelf-stable meal category. Combining the advantages of shelf-stable retort processing with non-metallic microwaveable packaging, this new breed of products is gaining in popularity due to consumer demand for better quality in convenience products.

According to the report, *Shelf-Stable and Refrigerated Microwaveable Meals*, published in October 1988 by Find/SVP, a New York City-based marketing research firm, shelf-stable microwaveable foods totaled approximately $90 million in retail sales in 1988. The report describes three product segments for microwaveable shelf-stable prepared foods:

- **Tub** products are single-serve prepared entree items available retort-processed in microwaveable plastic bowls or tubs.

- **Tray** products are single-serve entree items, similar in appearance and content to frozen entree products, packaged in microwaveable plastic – square or oval, tray-shaped containers.
- **Pouch** products are single-serve prepared entrees available in retort-processed pouches. They need not be microwaveable.

Find/SVP predicted that shelf-stable tub products could capture 50 percent of the prepared canned foods market within six years to reach sales of $3.6 million in 1994. Shelf-stable tray products could capture 10 percent of the prepared frozen foods market within a slightly longer period of time – perhaps eight years.

The report also points out that the tub products are a success because these products are positioned and perceived by the consumer as logical extensions of traditional canned prepared foods, while microwaveable tray products are opening up an entirely new category which offers a major marketing challenge.

During 1988, Hormel added three new items to its shelf-stable *Top Shelf* entree line – *Oriental Pepper Steak, Beef Stroganoff with Rice,* and *Beef Sukiyaki*. This line was the first tray-type, shelf-stable microwaveable product launched in the U.S. entering test market in January 1987.

Top Shelf was available in 55 percent of the country by the end of 1988. The company plans on completing national distribution during 1989 and reports that repeat sales of Top Shelf entrees are meeting the company's goals.

Capitalizing on Americans' familiarity with Top Shelf, Magic Pantry Foods, Inc., of Hamilton, Ontario, Canada, introduced a line of eight shelf-stable meals into a number of U.S. markets during 1988. Initial test market cities were Indianapolis, Cincinnati, Denver, Phoenix, Louisville, and Lexington. Oklahoma City, San Antonio, Salt Lake City, and Boise were added in early 1989. The company reports that sales of these products have been ahead of estimates.

The Magic Pantry meals are being marketed as "light ethnic entrees" under the *International Lites* brand name.

In the tub area of shelf-stable meal, Dial Foods, Phoenix, AZ, announced the establishment of the *Doubletree Foods* brand name for its *Lunch Bucket* line during 1988. Lunch Buckets have a two year or more shelf life at room temperature and can be heated in a microwave oven in 75 to 90 seconds. The line consists of nine entrees and six soups. Aimed at children for school lunches, adults for lunch at work, and seniors traveling in RVs, these entrees and soups went from 16 percent distribution in the U.S. at the beginning of 1988 to 65 percent by the end of 1988.

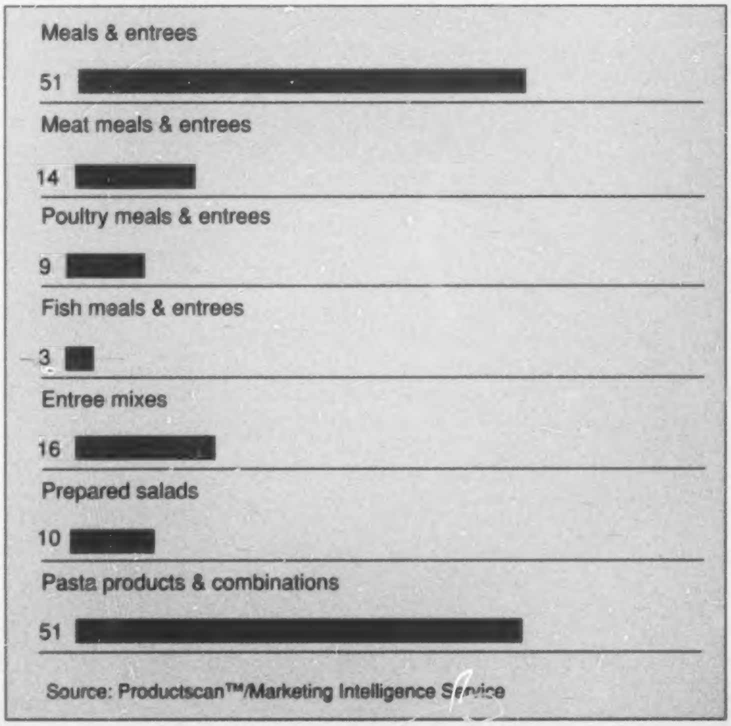
American Home Food Products, Inc., New York City, announced in 1988 the expansion of its *Chef Boyardee* line to include *Microwave Meals*. The line is packaged in single-serve, 7.5-ounce foam overwrapped, plastic, microwaveable containers that double as the serving bowl. Beef ravioli, beefaroni and spaghetti and meatballs are among the varieties offered. The national rollout began in the northeast part of the country.

A similar product to Lunch Buckets and Microwave Meals hails from Hormel. *Scalloped Potatoes and Ham, Corned Beef Hash* and *Dinty Moore Beef Stew* are among the varieties offered.

A shelf-stable soup line in microwaveable containers was entered into a Milwaukee test market during 1988 by Campbell Soup Co. Under its *Chunky Soup* brand, beef, chicken noodle, New England clam chowder, old fashioned chicken and sirloin burger varieties are offered.

A new concept in microwaveable, shelf-stable products comes from Beatrice/Hunt-

1988 shelf-stable introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

Wesson, Fullerton, CA. *Hunt's Minute Gourmet* packaged dinners is a six-item line of gourmet microwave packaged dinners that allows consumers to cook with a variety of fresh meats in the microwave oven.

"Minute Gourmet revolutionizes home cooking by optimizing microwave cooking technology without sacrificing flavor or quality," says Jim Jackson, director of marketing for new products at Beatrice/Hunt-Wesson. "The Minute Gourmet system is an advancement in microwave cooking and is so unique that there is a patent pending on the cooking system. One pound of fresh meat is placed in the mylar-lined, microwave cooking bag where it is seasoned and cooked in a special gourmet sauce in minutes."

Minute Gourmet has been available in the Southwest, Southeast and Midwest since September 1988. East and West Coasts introduction took place in January 1989. Chicken cacciatore, sweet & sour chicken, barbecued chicken, Oriental beef, Italian meatballs with sauce, and Cajun pork are the varieties offered. Each has a suggested retail price of $2.29.

Refrigerated meals

Refrigerated, prepared foods is a small category with a big potential. Satisfying consumers' desire for fresh, high-quality, convenient food, refrigerated microwaveable foods could climb to between $1.2 and $1.7 billion within ten years. This is the prediction of Find/SVP in its report, *Shelf-Stable and Refrigerated Microwaveable Meals*. The report stated that the category would reach between $5 and $15 million in 1988.

FreshNes Fresh made meals are a modified controlled atmosphere line of refrigerated main course salads and entrees designed to be heated in the microwave oven in less than five minutes.

Prepared refrigerated foods are competing in a crowded arena, though. They compete directly with growing deli departments in supermarkets and indirectly with all fast food. Michael P. Uetz, associate, Willard Bishop Consulting, Ltd., Barrington, IL, reported on a survey conducted by his company at the 1988 Food Marketing Institute's (FMI) annual convention. The survey, which involved focus group studies, in-store interviews of approximately 1,000 shoppers and follow-up telephone interviews, was designed to find out how consumers purchased and used refrigerated prepared foods.

"Shoppers interviewed in this study who are using refrigerated prepared foods are very excited about what these products have to offer," explained Uetz. "Nonusers appear to be holding back on a buying decision because they still aren't quite sure what it is these products have to offer."

When consumers who use refrigerated prepared foods were asked what were the most attractive product characteristics, they responded most often with homemade taste and convenience of the products. When asked what do these meals replace, 41 percent said scratch cooking, 28 percent said frozen entrees, another 28 percent said carryout foods and three percent said restaurant meals.

Controlled atmosphere packaging is allowing several manufacturers to compete with meals and entrees prepared in in-store delis.

A new $12 million plant began production of *FreshNes Fresh made meals* – a line of refrigerated main course salads and entrees designed to be heated in the microwave oven in less than five minutes. This modified controlled atmosphere line is being produced and marketed by FreshNes Foods Corporation, a new subsidiary of Nestlé Enterprises, Inc. The new company was formed in 1988 and is located in Solon, OH.

FreshNes Foods Corp. is committed to the new freshly prepared foods category. "We see this as the fastest growing category in supermarkets over the next decade and we want to be clearly identified as category leaders," said Milton Miles, president of FreshNes Foods.

The initial line of eight main course salads included items such as chicken salad Oriental, albacore tuna salad with pasta, pasta primavera and a layered Mexican-style fiesta salad. The two initial entrees were chicken breast primavera, made with chicken breast tenderloins in a creamy sauce accented with Madeira wine served over angel hair pasta,

Circle 59 or see FEM, p. 155 →

and chicken supreme, broiled half-cut chicken breast on a bed of vegetables with a chablis sauces. The selections will be changed to keep up with current trends and seasonal changes.

Currently, FreshNes products are available in the Cleveland/Akron/Canton area with direct store delivery. Retail price ranges from about $2.39 to $4.39.

Another line of refrigerated products which initially consisted of salads, pastas and sauces, pizza kits and desserts in 1987 was later expanded to include entrees. Under the *Chillery* label, Kraft began testing the salads, pastas and sauces, pizza kits and desserts in Kansas City, MO. The entrees are being tested in Pittsfield, MA.

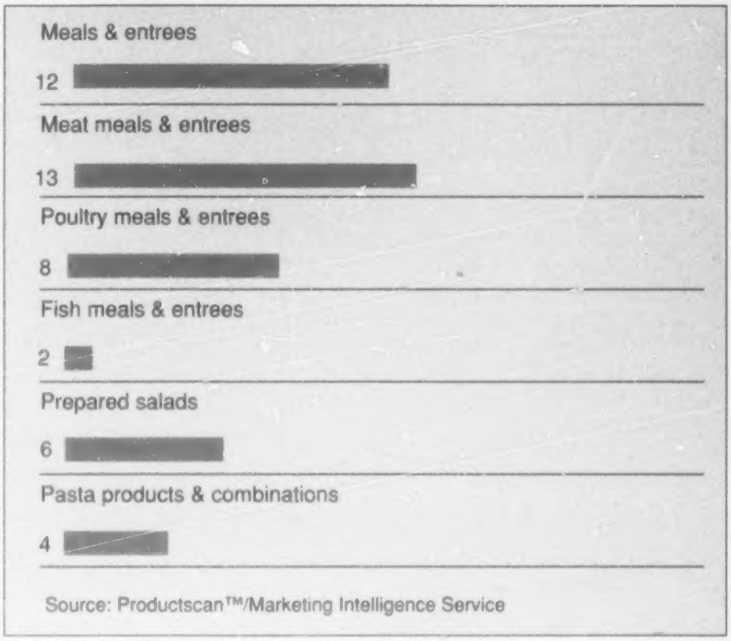
Early this year, Philip Morris Cos. announced it would discontinue *Culinova* refrigerated foods and concentrate on the Chillery line. The reason why expanded distribution of Culinova was stalled was because a refrigerated distribution system had to be developed from scratch. Kraft was using its refrigerated foodservice distribution system for Chillery.

Capitalizing on a process developed in France – sous vide or under vacuum – Culinary Brands, Inc. introduced a line of fresh, refrigerated, fully prepared food products. The sous vide processing method, developed in France during the 1970s, involves sealing fresh, raw ingredients in a pouch and pulling a vacuum. The pouch is cooked under closely controlled heat and moisture levels, then chilled to 32°F until reheating for serving.

Culinary Brands, Inc. was founded in 1986 and is located in Sausalito, CA. Additional production facilities in central California are scheduled to begin operations later this year. The company began producing refrigerated prepared foods for restaurants but in early 1988 introduced a retail line – *4 Chefs Fresh Food To Go* – into a limited number of supermarkets in the San Francisco Bay Area. Earlier this year Culinary Brands discontinued the retail line due to consumers' lack of familiarity with sous vide. The company will concentrate on foodservice markets.

The nation's largest manufacturer of prepared salads, Wheeling, IL-based Orval Kent Food Co. repositioned its popular *Salad Singles* line during 1988. A new peggable package was introduced for Salad Singles so they could hang next to lunch meats. This was done in response to research showing that these salads were most often purchased as an alternative to lunch meat. In addition, a seafood salad was added to the Salad Single line during 1988. The repositioning has resulted in increased sales, according to the company.

1988 refrigerated introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

Low, light meats

According to USDA, per-capita consumption of poultry surpassed per-capita consumption of beef in the U.S. for the second consecutive year in 1988. Red-meat processors are reacting, though slowly. According to the Productscan survey, 27 meat products positioned as "low sodium," "low fat" and/or "light/lite" were introduced in 1988 as compared to only nine in '87. Most interesting were branded fresh-beef cuts combining selective breeding with tight trim to cut calories. Examples: *Larsen Beef*, supplied refrigerated in conventional plastic trays and film overwrap to Midwestern supermarket chains by Larsen Beef Co., an Ohio packer; and *Heritage Premium Quality Beef*, a lean USDA Choice grade marketed by Hughes Supermarkets in Southern California. According to Hughes, Heritage beef "has fewer calories, less cholesterol, lower sodium and less fat than whole chicken" and is the only Choice-grade beef cleared by USDA which can be advertised to contain 25 to 50 percent less fat than typical Choice beef. A 3-oz. serving of Heritage round steak, for example, contains 150 calories as compared to 192 in a 3-oz. serving of typical Choice round steak, says Hughes. Although heavy, grain-fed cattle of Yield Grades 1 and 2, Heritage beef is based on "detailed scientific research into the genetic tendencies of certain breeds of cattle which produce leaner beef" and is trimmed to less than ¼-inch external fat, says Hughes.

In processed meats, Hormel extended its historic *Spam* brand with new *Spam Lite*, while Sara Lee's Hillshire Farms unit added *Lite Smoked Sausage* and *Lite Polska Kielbasa* with 25 percent less fat than typical varieties. General Foods' Oscar Mayer unit introduced *Oscar Mayer Breakfast Ham* labeled "93 percent less fat." Kahn's & Co. introduced five varieties of *Lite Sensations Cold Cuts*: pastrami, corned beef, smoked beef, smoked ham and smoked honey ham. Odom Sausage Co. added "lite" pork-sausage links and patties to its *Tennessee Pride* line; Rudy's Farm extended its line with *Rudy's Farm Lite Sausage*. Swift Independent added vac-packed *Swift Premium Light Pork* butts and loins. Swift-Eckrich extended its variety-pack luncheon meats with an *Eckrich Naturally Lean Smorgas Pack* including cooked ham, smoked turkey, smoked chicken breast and chopped ham.

95%
Breakfast Ham
Microwave
Ham & Cheese
Muffins
Under
200
JONES
GOLDEN BROWN
LIGHT
SAUSAGE

These days, with the advent of lighter breakfast foods, consumers can eat hearty and not feel guilty about it.

New frozen meat dinners and entrees positioned as "light" or low in fat included *Eating Right* Beef Ranchero and Szechuan Beef from Kraft's All American Gourmet unit, a six-item line of Mexican-style *El Charrito Light Entrees* from Eagle Crest Foods, two *Le Menu Light Style Dinners* (Salisbury Steak and Veal Marsala) from Campbell Soup Co. and *Weight Watchers Candle Lite* London Broil from Foodways International.

'Healthy' dairy explosion

As confirmed by the FDA and FMI studies, fats are the major consumer nutrition concern, and the dairy industry responded with an explosion of 170 new non-fluid products positioned as "low fat," "low cholesterol" and/or "light/lite" in 1988 as compared to 46 in '87. Breakdown: ice cream and novelties, 63; cheese, 39; yogurts and imitation yogurts, 33; butter, margarine and blends, 14; dairy substitutes, 9; "other," 12.

The trend was typified by Kraft President & Chief Operating Officer Michael J. Miles (now president and COO at newly-merged Kraft General Foods), who told Chicago investment analysts last September that "light, low-fat products will be the drivers" for dairy-group growth at Kraft (*FE*, November '88). Borden Co. concurs with the trend, noting that while whole-milk consumption declined industry-wide, per-capita consumption of lowfat milk gained 24 percent 1981-87 and "the widening range of lowfat and nonfat dairy products—along with the more recent introduction of low-calorie, sugar-free items—is expected to lift sales further through the next decade." According to a recent beverage study by MRCA Information Services, skim and low-fat milks now represent 44 percent of all in-home milk use.

In this section we will look specifically at the cheese, butter/margarine, and dairy substitutes categories. For discussion of additional healthy-oriented dairy products, see our later sections on low-cal frozen desserts, fruit-based products, yogurts, and premium desserts.

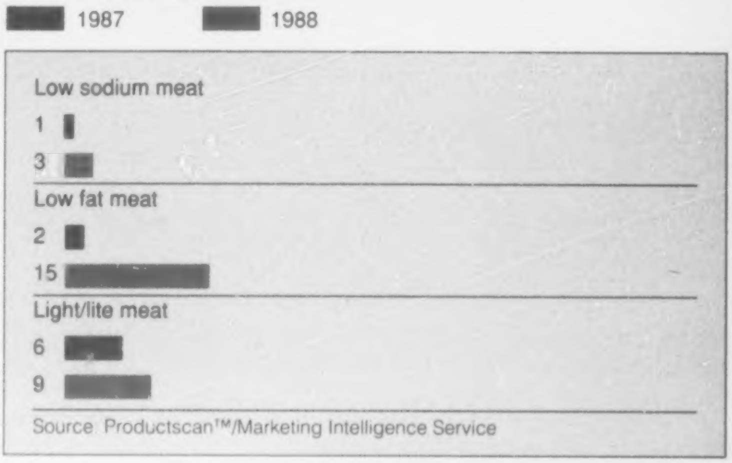
- **Cheese:** According to a March '89 report from the Institute of Food Technologists, cheese ranks high in fat calories among high protein meat and dairy foods. Sixty-six percent of the calories in Swiss cheese, for example, come from fat; 74 percent of the calories in cheddar and 75 percent of the calories in pasteurized American are contributed by fat. Cheesemakers took aim at consumer fat concerns by introducing 39 low-fat cheese products in 1988, up from 10 in '87. Kraft led the parade with 15 varieties of *Light Naturals* natural-cheese blocks, slices and shreds in Cheddar, Colby, Swiss and Monterey Jack varieties, plus *Light n' Lively* processed American slices. Borden introduced *Light Natural* reduced-fat shreds in Mozzarella and Sharp Cheddar. *Weight Watchers* checked in with American, Dijon American, Sharp Cheddar, Swiss and Low-Sodium sliced-cheese products. Sargento introduced *Natural Light* ricotta cheese made of part-skim milk with "75 percent less fat, 75 percent less cholesterol and over 50 percent fewer calories than traditional, whole-milk ricotta" yet offering "twice the calcium of cottage cheese." Lever Brothers rolled-out five flavors of *Shedd's Country Crock Spreadable Cheese*, positioned as low in cholesterol. Most exotic lowfat domestic introductions: *Galilee Creme de Chevre* goat cheese in plain, garlic and smoked-salmon flavors from Galaxy Cheese Co., which also introduced *Fromagg* cheese substitutes in Ricotta, Cottage and Cream cheese varieties. Low-fat imports included *Geska Genuine* Swiss Sap Sago Green Cheese from Geska Gesellschaft and *Le Roule of France* herb-and-garlic flavored Roule Light cheese from Fromageries Triballat.

- **Butter/margarine:** fourteen butter/margarine/blend spreads were introduced in '88 atop 11 in '87. Lipton introduced *Country Fair Light Butter* in lightly salted, unsalted and whipped varieties; Land O' Lakes *Country Morning Blend Light Butter*. Kraft unveiled *Touch of Butter Spread* while Nabisco extended its *Blue Bonnet* brand to include *Better Blend Vegetable Oil and Dairy Spread*, salted and unsalted. New margarine offerings in '88: *Promise Extra Light* 40% vegetable oil spread from Lever Brothers; *Fleischmann's Diet 100% Corn Oil Spread* from Standard Brands.

- **Dairy substitutes:** Excluding cheese substitutes, nine lowfat substitute dairy products were unveiled in 1988 as compared to only one in '87, according to Productscan. Two of these were sour-cream substitutes: *Fromagg Sour Cream Substitute* from Galaxy Cheese, *Slender Choice Sour Cream Substitute* from Merico, Inc. Several others were non-dairy creamers. Tofutti Brands developed *Egg Watchers*, a no-cholesterol egg replacer with 40 percent fewer calories and 75 percent less fat than real eggs, for making "any dish...that can be made with whole eggs," such as omelettes and quiche. Also from Tofutti Brands: *Better Than Cream Cheese*, a non-dairy imitation cream cheese with no cholesterol or butterfat and 20 percent fewer calories than the real thing.

- **"Other":** Twelve other lowfat dairy products not in traditional classifications were introduced in '88 versus four in '87. Among them: light sour-cream products from Land O'Lakes and Dean Foods; *Viva Cottage Classics* lowfat cottage cheese in four different flavors, from Borden. Most intriguing: *Lowered Cholesterol Grade A Eggs*, from Full Spectrum Farms, Inc.

1987, 1988 low sodium, low fat, light/lite meat introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

High fiber

Believe it or not, fiber does not rank among the top nutritional concerns of consumers, according to Food Marketing Institute's 1988 consumer-attitudes survey. Consumers are more worried about fat, salt, cholesterol, vitamins/minerals and sugar—in that order—according to the FMI study. This is supported by FDA's 1988 Health & Diet Survey, where consumers report eating less fat and cholesterol but not significantly increasing their fiber intake since 1986.

These statistics, however, only serve to highlight even more what has to be called "the oat-bran boom," sparked by widely-publicized research showing oat bran fiber, in particular, as reducing cholesterol levels. This led last year to a wide variety of oat-bran products aimed at consumer concerns about cholesterol. Quaker Oats, for example, reported sales of its bran products zooming more than 700 percent between May '87 and May '88.

Overall, the breakfast cereal fiber fracas saw no fewer than 33 new cereals in 1988 positioned as high fiber or fiber-added, atop 24 in 1987, according to Market Intelligence Service's Productscan. Kellogg, which according to the Department of Commerce dominates the industry with 35.9 percent of sales, introduced *Fibre Up* "containing more dietary fiber than any other ready-to-eat cereal" and a line extension, *All Bran With Extra Fiber*.

Several manufacturers introduced new high-fiber cereals based on a turn-of-the-century Swiss breakfast dish called "muesli" (*FE* Sept. '86). Examples: Kellogg's *Mueslix Bran Muesli Cereal* and *Mueslix Five Grain Muesli Cereal*; Ralston Purina *Muesli Cereal* in two varieties (Rai-

NEW!
Yoplait
Light
90 CALORIES
RASPBERRY
BLUEBERRY
STRAWBERRY

Today's health and fitness trends have pumped adrenaline into the sales of frozen yogurt.

sins, Dates & Almonds and Raisins, Peaches & Pecans); Irish Cereal Products' *Extra Fruit Muesli*; Golden Temple Bakery's *Bran Mornin' Muesli* and *Iowa Mornin' Muesli*.

Number-two cereal producer General Mills (19.8 percent of industry sales) introduced *Fiber One*; *Clusters*, a blend of bran flakes and nut clusters which GM said along with *Oatmeal Raisin Crisp* (its first oatmeal-flake cereal) and *Raisin Nut Bran*, both introduced in '87, "contributed two market share points in 1988"; and *Total Raisin Bran*, a brand extension. General Mills also flagged its popular *Cheerios* package as "An excellent source of oat bran" and unveiled its first entries into the hot-cereal category: *Total Oatmeal* in two flavors plus a variety pack, and *Oatmeal Swirlers*, featuring stir-in packets of real fruit. By the end of fiscal '88 (ended May 29), said GM, Total Oatmeal had captured a 12-percent dollar share of the instant-oatmeal segment.

Third-ranked cereal producer General Foods (12.6 percent of sales) added Cinnamon Apple Crisp to its *Post Fruit & Fibre* line and reintroduced *Post Oat Flakes*, a discontinued product from the '60s whose time has finally come. In addition to its muesli cereals, Ralston Purina (7.2 percent of cereal sales) introduced *Bran News* in two flavors and reformulated its NutraSweet-flavored *Sun Flakes* (introduced in '86) with fiber. Nabisco extended its shredded-wheat line with *Shredded Wheat Raisin Bran* and introduced *Frosted Wheat Squares*, positioned as high in fiber.

Quaker Oats, which dominates the hot-cereal segment with a 66-percent share, introduced Quaker *Extra*, a three-flavor (plus variety pack) "sub-line" of instant oatmeal fortified with 100 percent of the USRDA of 10 vitamins and iron, and added a "family pack" to its *Instant Quaker Oatmeal*. Quaker reported that greater consumer awareness of oatmeal's health benefits plus its current "Quaker Oats...It's The Right Thing To Do" campaign boosted hot-cereal sales by 23 percent and unit volume by 20 percent in fiscal '88 (ended June 30). In the ready-to-eat segment, where the firm claims an 8.3-percent market share, Quaker rolled out *Oat Squares* into national distribution, added apple-cinnamon flavor to *Oh!s* and introduced *Crunchy Bran*. Skyrocketing sales of *Quaker Oat Bran* forced the company to allocate distribution, but Chairman & CEO William D. Smithburg told shareholders at the company's annual meeting on November 9 that "we're increasing oat-bran production and we hope to end oat-bran allocation by early 1989."

Bakers were slower than their colleagues in the breakfast-cereal business to cash in on dietary-fiber, perhaps because a few were burned early in the decade when they introduced cellulose-added breads. (Cellulose is derived from wood, and negative consumer perceptions probably caused its demise.)

But the frenzy over fiber spread from the cereal shelf to the bakery rack as 16 high-fiber bakery products were introduced in 1987 and intensified as 18 more were unveiled last year, according to Productscan. And, like the cereal producers, the bakers discovered oat bran. New in '88:

- *Oatmeal Goodness Bread* in four varieties—Cinnamon Oatmeal, Oatmeal & Bran, Oatmeal & Sunflower Seeds, and Wheat Oatmeal—from Continental Baking Co. Labels proclaim "Extra oat bran added"; that "Oat Bran may help reduce cholesterol"; and even offer $5 off the price of a videotape entitled "The 8-Week Cholesterol Cure."
- *Grant's Farm* Oat Bran Bread and Oatmeal & Toasted Almonds Bread, from Campbell Taggart.
- *Brownberry* "Bakery Light" Oatmeal Bread with only "40 calories per slice," from Arnold Foods. Arnold also added a Country Oat variety to its line of *Bran'nola* "natural high fiber" breads.
- *Roman Meal* Honey Nut & Oat Bran Bread, from bakers licensed by Roman Meal Co.
- *Country Hearth* High Fiber Bread with Oatmeal, from Schwebel Baking Co.
- *Jaclyn's* Fresh Frozen Wheat-Free Muffins: Apple Oatmeal Bran, Banana Oatmeal Bran, Oatbran and Raisin Bran.
- *Pepperidge Farm* Oatmeal Bread, which makes no label claims beyond "No artificial preservatives."

- *Natural Ovens of Manitowoc* Raisin Bran Muffins, labeled "no preservatives" and stickered "Made with oat bran." Natural Ovens also markets oat bran *per se* in one-lb. packages.

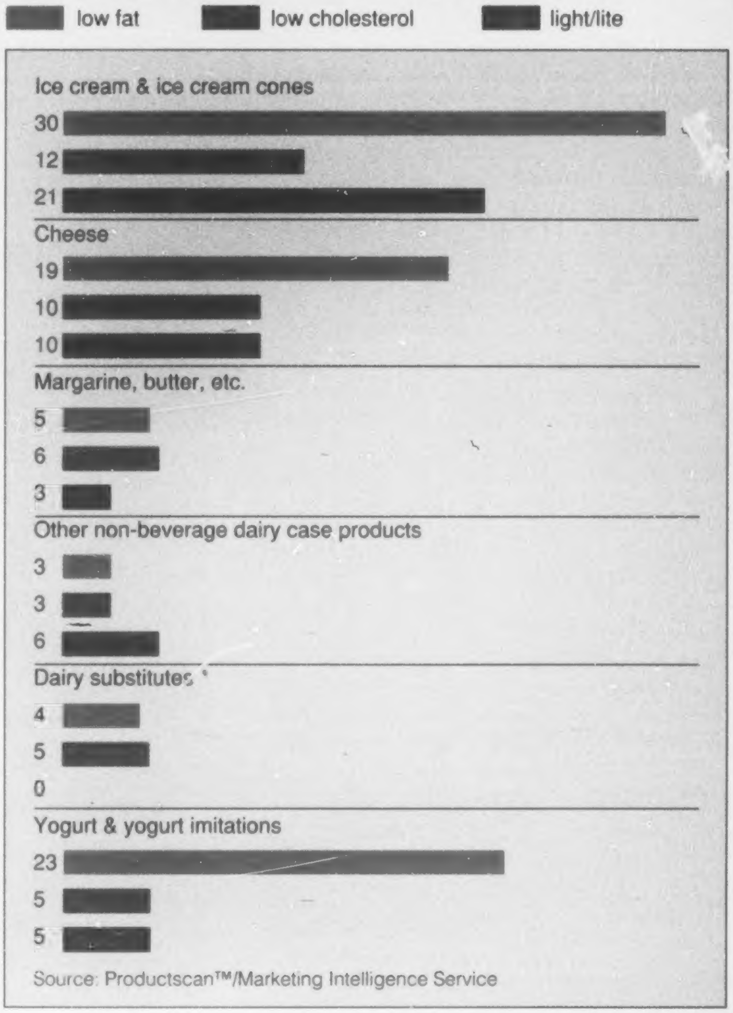
Bakery applications of oat bran were not limited to finished baked products. Procter & Gamble introduced *Duncan Hines* Oat Bran Blueberry Muffin Mix, labeled "A significant source of natural fiber." Thompson Kitchens introduced *Pritikin* Rice Cakes (positioned as a snack food) with "fiber rich oat bran added," also very low in sodium and only 30 calories each.

Other new bakery products positioned by major bakers as high in fiber or with fiber added included *Wonder* Hi-Fiber Bread in soft white and soft wheat varieties from Continental Baking Co., *Five Star Fibre Bread* in three varieties from Pepperidge Farm, *Orowheat* California Breakfast Bread in two varieties from General Foods, *Lite'r 35* Bread in white and wheat from Heileman Baking Co., and *Heritage Lite* and *Sunbeam Lite* Multigrain Breads from Waldensian Bakeries. Ralston Purina extended its *Ry Krisp* cracker line with *Sesame Ry Krisp* labeled "Rich in fiber" with no cholesterol and only 25 calories per cracker. Pacific Rice Products labeled its *Crispy Cakes* as a "Good source of fiber," very low in sodium and 30 calories each. Nabisco extended its *Triscuit* crackers with a wheat and bran variety, although it is not labeled as high in fiber.

Beyond cereals and bakery products, fiber-fortified food products are few but growing.

As reported earlier in *Food Engineering* (October '88), fiber-added foods introduced during the first seven months of 1988 included: four varieties of canned beans, three snack bars, seven other snack items, four tofu desserts, four yogurt products, three frozen entrees and a dry-mix rice dish. Three fiber-added beverage mixes were introduced in 1988, one less than in '87, all in the health-foods area.

1988 'healthy' dairy introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

Children's food

Population estimates from the U.S. Department of Commerce show that the market for children's foods should remain relatively constant. From 1987 through the year 2010, the number of children aged five through thirteen in the U.S. is expected to remain between 31 and 34 million.

In addition to shear size, the significance of this large market includes the fact that both parents in many families with young children work outside of the home. Dual-income couples numbered approximately 26 million last year. Approximately 80 percent of these dual earners had children under the age of eighteen, according to *American Demographics*.

Several companies have discovered a niche in the market by providing easy-to-prepare, nutritious food for children.

For the first time, 1988 saw the introduction of shelf-stable meals aimed specifically at children. Geo. A. Hormel & Company introduced *Kid's Kitchen* as shelf-stable microwaveable entrees that children can make themselves. Advanced packaging allows the product to be stored unrefrigerated for up to 18 months.

Children aged five to 12 are targeted as consumers of the product while Hormel said children between the ages of five to seven may start learning to use the microwave to fix the meal themselves. The product is expected to be a boon to latchkey children who return home from school and can make themselves dinner while their parents are away at work.

Shelf stable products are a godsend to manufacturers who want to avoid the fierce competition for freezer space at supermarkets. In addition, distribution costs are reduced since there is no need for refrigerated trucks to ship the product.

Kid's Kitchen comes in seven varieties: Macaroni and Cheese; Spaghetti with Meatballs in Tomato Sauce; Chicken Chow Mein; Spaghetti Rings in Tomato Sauce; Macaroni and Chicken; Chunky Vegetables and Beef in Sauce and Beef Ravioli in Tomato Sauce. Each is formulated to meet the nutritional demands of parents and have been taste-tested by hundreds of children to meet their approval. Test marketing of Kid's Kitchen was originally scheduled for 1988 but has been rescheduled to begin in Phoenix and Detroit in late 1989 with national rollout planned for early 1990.

My Own Meal, Inc. of Deerfield, IL launched shelf-stable meals packaged in microwaveable plastic pouches (see the February issue of *Food Engineering*, page 44). However, Maryanne Jackson, founder and president, has a slightly different marketing slant than Hormel.

RY KRISP
LIGHT

The frenzy over fiber has led to the bakery rack as 16 high-fiber bakery products were introduced in 1987 and intensified as 18 more were unveiled last year, according to Productscan.

As a former Beatrice executive who has two children of her own, Jackson said, "It's not important that kids fix the meal themselves but more so that mothers feel good about its nutritional value." *My Own Meal* is aimed at children aged two to eight. Jackson plans to build it as a strong regional brand within the Chicago, Northern Indiana, Ohio, Wisconsin area.

Varieties of My Own Meal include: chicken, vegetables and brown rice; chicken and vegetables; turkey meatballs, noodles and vegetables; macaroni, lentil, barley and pork in tomato sauce.

Multi-Natural Corporation of Hastings-on-the-Hudson, NY is planning to relaunch its line of frozen dinners for children aged one to five. Liz Bensley, president, said *My Food* had been test marketed in northern New Jersey but will be repackaged before being marketed on the East Coast.

Bensley said My Food is high in protein, complex carbohydrates, vitamins and minerals as well as low in saturated fat. No salt, sugar, artificial ingredients or preservatives are used, she said.

The surge in upscale faire has continued with the debut of *Mommy Made and Daddy too!* home-delivered baby food in New York City. The baby food contains no sugar, salt or preservatives and is delivered twice a week, hours after it is made. Other new entries in the baby food market:

- Beech-Nut *Babies First* and Heinz' *Beginner Foods* are new lines for babies younger than six months old.
- Organically-grown baby food from Earth's Best is moving from health food stores to supermarkets.

Pet food

If food processors ever get the feeling that business is going to the dogs, maybe going in that direction isn't such a bad idea. Dry dog food sales in 1988 were approximately $1.8 billion, according to SAMI/Burke. Sales in 1987 were approximately $1.7 billion. Sales of wet dog food jumped from $850 million in 1987 to $890 million last year. While tonnage of dry food dropped slightly, tonnage of wet dog food increased from 1.70 million tons in 1987 to 1.73 million tons in 1988. The percent of increase in both tonnage and dollars for wet dog food suggests that there is increased demand for the higher priced "premium" foods for dogs. Snacks for dogs jumped in sales from $371 million in 1987 to $402 million in 1988. New dog foods showed that humans often project some of their own wants and needs onto their pets:

- Famous Fido Doggie Deli, Inc. of Chicago offered cookies for dogs in cheese, liver and carob-liver varieties.

- Gaines Foods, Inc. of Tarrytown, NY, subsidiary of Quaker Oats launched *Gaines Cycle 3 Lite Dog Food* that is "expertly formulated for the special needs of overweight or less active dogs." It has 20 percent fewer calories than regular dog food.
- Mountainside Products, Inc. of Rutland, VT marketed *Mountainside Gourmet Jumbo Chocolate Chip* and *La Petzza Pizza Pet Treats.*
- H.J. Heinz's Star-Kist Foods, Inc. division, based in Long Beach, CA, has unveiled *Reward* dog food. The company said the seven varieties exceed nutritional recommendations from the National Research Council.

Cat owners are also showering their pets with gourmet dinners that sound as tasty as a restaurant's top menu items. Semi-moist cat food gave way to wet cat foods as 1988 sales for the latter totaled $1.2 billion up from 1987's $1.16 billion. Cat snacks sales leaped from 1987's $26 million to $33 million in 1988. New products:

- Star-Kist Foods added three flavors to its *Amore Gourmet Canned Cat Food*: Classic Beef & Liver; Gourmet Giblets; and Halibut & Cod.
- Kal Kan Foods, Inc. of Vernon, CA launched Catfish; Chunky Lamb; and Trout varieties of *Kal Kan Cat Food.*
- Ralston-Purina Company of St. Louis has added three new flavors to its *Purina Unique Cat Food* line: Ocean Fish with Shrimp in Aspic; Pacific Mackerel in Crab Jelly; and Sardines and Chicken in Aspic.

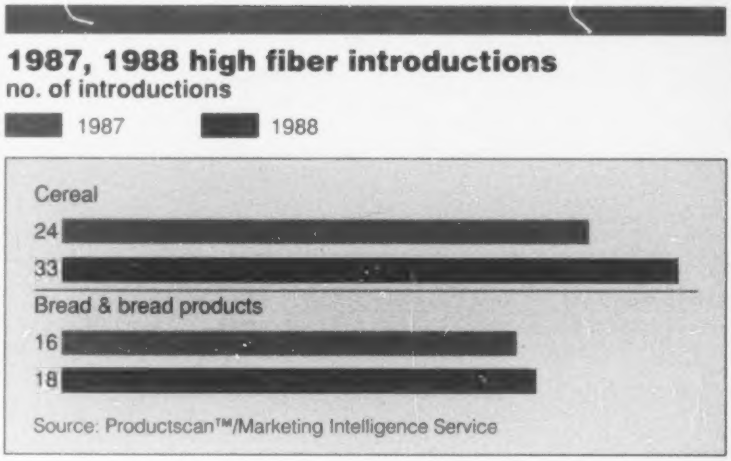
The trend of pet owners to indulge their pets with treats that appeal to humans is expected to continue. Ice cream-like treats for dogs will be launched in April 1989 from Associated Ice Cream. William Tyznik, an animal science professor at Ohio State University developed *Frosty Paws* for pet owners who enjoy feeding Fido ice cream. Most of the lactose has been removed from the whey to make it more digestible for dogs. Mr. Tyznik has been quoted by *Advertising Week* as saying the ice cream-like treat may be eaten by humans also.

Desserts

To better appreciate what types of new frozen dessert products are being introduced by food companies, it pays to take a look at what's happening within restaurants. As with other food categories we've discussed in this article, what consumers order on a restaurant menu is what they'll be hankering for near the frozen food case in the local supermarket.

Without a doubt, the sweet tooth is back. Restaurant dessert orders, which languished for much of the 1980s as diet-conscious consumers opted to forego end-of-meal treats, have experienced a resurgence of interest. Dessert orders increased by 3.2 percent in 1987 and 6.2 percent just during the first three quarters of 1988, according to the National Restaurant Association (NRA).

This follows a 1.3 percent decline in desserts ordered in restaurants between 1982 and 1987. "America is rediscovering its sweet tooth," said NRA President Jim L. Peterson. "Even weight-conscious consumers now feel that it's all right to splurge now and then."


1987, 1988 high fiber introductions
no. of introductions

Source: Productscan™/Marketing Intelligence Service

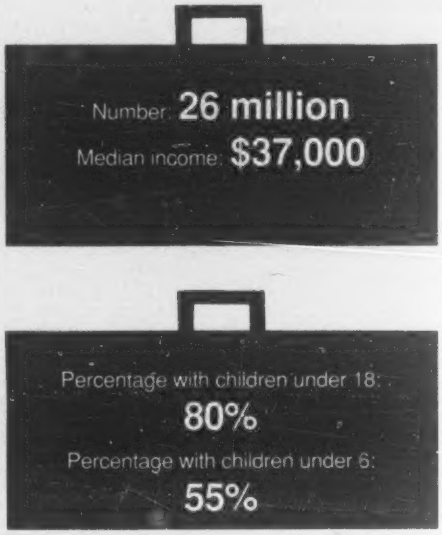
Newly released NRA Consumer Research on Eating Share Trends (CREST) data reveals that ice cream is the perennial favorite of restaurant patrons. Ice cream orders gained 12 percent since 1982, representing 51 percent of all desserts orders in 1987. This increased interest in ice cream spilled over into the retail side with manufacturers reporting sales of more than $9.4 billion in 1987 according to FIND/SVP with frozen yogurt, ice milk and non-dairy frozen desserts showing the most dramatic growth. Ice cream sales are projected to top $11.5 billion in 1997, according to Business Trend Analysts.

Although superpremium ice cream is not the largest segment within the ice cream category, it is an area that has witnessed rapid growth in per capita consumption. However, industry sources conflict in their accounts of premium ice cream's current vitality on the market. FIND/SVP reports premium ice-cream sales slumped 19 percent in 1986 and another 13 percent in 1987. On an optimistic

Kid's Kitchen
Spaghetti with Meatballs
In Tomato Sauce
MICROWAVE
NEW
NET WT. 7½ OZ.

The market for children's entrees will remain fairly steady over the next few decades.

Number of dual-income couples, 1988



Source: American Demographics

note, Frost & Sullivan, a New York City-based research firm predicts that superpremium ice cream will show 53 percent growth in sales from last year's $209 million to $320 million in 1992. The category shows a much more rapid rate of growth (more than three to one) over the larger "indulgent desserts" categories, such as frozen novelties and frozen bakery desserts. FIND/SVP estimates superpremium production doubled between 1980 and 1985.

While there is no strict definition of superpremium ice cream, manufacturers use the term to describe ice cream that contains: "natural" or high quality ingredients; 15-20 percent air in the product, compared to up to 50 percent in regular ice cream; and 15-20 percent butterfat, compared to as little as ten percent in regular ice cream.

The proliferation of new superpremium introductions has created intense competition for limited freezer space. In addition to traditional ice cream companies, candy companies have joined in the fray by selling licenses to produce ice cream containing chunks of popular sweets. Some notable introductions in 1988:

- DCA Food Industries, Inc. of New York sublicensed with Tootsie Roll Industries, Inc. to create *An American Tradition Tootsie Roll Ice Cream*. Varieties include: Tootsie Roll Ripple, Tootsie Roll Chunks, and Tootsie Roll Crunch with Almonds.
- Dove International, Division of Mars, Inc. of Burr Ridge, IL released *3 Musketeers Ice Cream Bars* that feature the taste of the popular candy bar in a chocolate-coated vanilla ice cream bar.
- Borden, Inc. of Houston updated Cracker Jack Candied Popcorn with its introduction of *Cracker Jack Ice Cream Bars*.
- Oberweis Dairy, Inc. of Aurora, IL has been licensed by several confectionery companies to make: *Milk Duds Candy, Slo Poke Carmel Candy, Whoppers Malted Milk Candy and Zagnut Candy Bar* ice cream.

Among the new players in the ice cream freezer case is Betty Crocker who took a break from baking to turn out *Brownie Sundae Ice Cream and Brownie Sandwiches.* The product is distributed by Vroman Foods, Inc. of Toldeo, OH, a subsidiary of General Mills, Inc.

Part of the mystique of superpremium ice creams are the exotic names that describe the flavors. Sometimes the names reflect a European ambience that manufacturers want to impart to the product to give it an upscale appeal while other names are simply exciting. The Cone Collection, Division of Taste Buds, Inc. of Green Farms, CT combined both approaches by introducing *Premium Cone Collection Ice Cream Cones.* Flavors include: Chocolate Obsession; Raspberry Romance; Forbidden Apple Cinnamon; Amaretto Mi Amore; Cappuccino; and Mocha Madness. Other examples:

- McConnell's Fine Ice Creams of Santa Barbara, CA offered: Amaretto Almond; Cappuccino, and Vermont Blueberry.
- Ben & Jerry's Homemade Ice Cream of

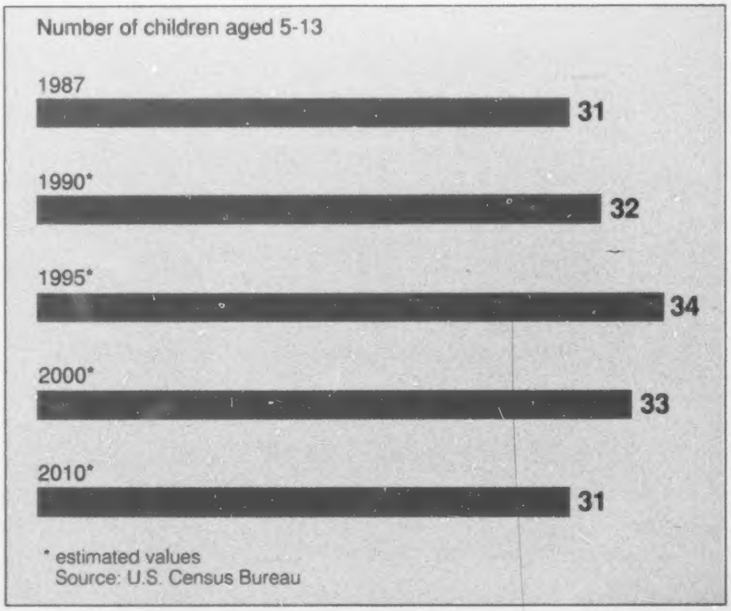
Waterbury, VT released more flavors: Butter Pecan; Chocolate; Heath Bar Crunch; Strawberry; Vanilla Chocolate Chunk; White Russian; and Chunky Monkey.

- Dickie Dee Ice Cream Ltd., subsidiary of Ault Dairies of London, Ontario introduced *Richard D's Vanilla Ice Cream Bars*. The line features 14 percent butterfat, imported pure chocolate covering and "a whisper of maple syrup" in its Chipwich Double Dutch and Chocolate Almond Cookies.
- Leichtman Ice Cream of Hazelton, PA tempts consumers with *Sinfully Yours Ice Cream*. Six varieties include: Calvin's Choice; Devil's Island Chocolate; Georgia Peach; Hazelnut Fudge; Heavenly Vanilla; and Viennese Crunch.
- Haagen-Dazs Co., Inc. of Teaneck, NJ introduced a vanilla ice cream bar dipped in Belgian milk chocolate and almonds.
- Dreyer's Grand Ice Cream Co., for example, introduced *Dreyer's Grand Light* ice cream in seven varieties including gourmet flavors such as Chocolate Fudge Mousse, New York Blueberry Cheesecake and Tempting Toffee Crunch. Purity Dairies rolled-out *Purity Gourmet Lite* ice cream in six flavors including Amaretto Almondine and Lemon Chiffon Pie. H.P. Hood introduced *Hood Light* Alaskan White Chocolate Avalanche and Triple Nut Cluster Sundae ice creams, plus two varieties of light ice-cream sandwiches.

Although approximately 90 percent of the households surveyed purchase ice cream, according to FIND/SVP, the popularity of ice cream alternatives continue to rise. Today's health and fitness trends have pumped adrenaline into the sales of frozen yogurt and fruit ices. Although the category is booming, the growth of ice milk and other frozen confections is on a much smaller scale than ice cream. According to the International Ice Cream Association's latest figures, ice cream production in 1987 was approximately 931 million gallons, compared to 923 million gallons in 1986. Ice milk production is approximately one-third that amount with 330 million gallons produced in 1987, up from 314 gallons the prior year. Much of the activity in the category is simply manufacturers increasing their advertising regarding ice milk products' lower fat content compared to ice cream. Some new products:

- H. J. Heinz's Weight Watchers International of Manhasset, NY unveiled a new ice milk line, *Weight Watchers Grand Collection Ice Milk* in: Cappuccino; Chocolate Fudge; Fudge Marble; Peaches 'n Creme; Strawberries 'n Creme; Swiss Vanilla; and Chocolate, Neapolitan and Vanilla. They are said to be made of all natural ingredients and contain 100 calories per serving.
- DCA Food Industries has been licensed by Cumberland Packing Corp. of St. Louis to launch *Sweet 'N Low Dietary Bars*. Consumers are most familiar with the company's line of artificial sweetener packaged in little pink packets. The artificially flavored vanilla bars are covered with a premium chocolate flavored coating that is "very low in sodium." Each bar has 120 calories.
- Kraft Inc.'s Breyers Ice Cream of Lansing, MI also unveiled an ice milk line. *Breyers Light Ice Milk* has one third less butterfat than ice cream. Flavors include: Chocolate Fudge Swirl; Chocolate Malted; Fudge Toffee Parfait; Natural Strawberry; Natural Vanilla; and Praline Almond Crunch.
- Imagine Foods, Inc. of Palo Alto, CA debuted *Rice Dream Non-Dairy Dessert*. The company said it uses a special process to change the starch in brown rice into natural sugars which are mixed with ingredients like carob chips to make the products. The frozen desserts are said to be cholesterol-free, low-fat, low-calorie, low-sodium and Kosher. Flavors include: Mint Carob Chip and Vanilla Swiss Almond.
- Borden premiered *Borden Light Premium Ice Milk* which has 33 percent less fat than ice cream. Flavors include: Chocolate

Children's food market
(in millions)



* estimated values
Source: U.S. Census Bureau

Chip; Cookies 'N Cream; Honey Roasted Maple Walnut; Mocha Almond Fudge Swirl; Praline Pecans 'N Cream; Raspberry Swirl; Strawberries 'N Cream; and Vanilla.

- French American Ice Cream Co., Inc. of Walnut Creek, CA offered *Cafe Glace Light Deluxe Ice Milk*. It has less than 100 calories per serving, is 95 percent fat-free, and uses pure fruit juice as a sweetener.
- Reynolds Metals Co.'s Eskimo-Pie Corp. of Richmond, VA presented its *Sugar-Free Eskimo Pie* which is aspartame-sweetened. Industry analysts commented that the growth of aspartame frozen novelties has been much slower than the first time beverages were launched with the sweetener.
- Barber's Ice Cream Co. scooped its *Lite Premium Ice Milk* in seven flavors; Knudsen *Nice n' Light 97% Fat Free Ice Milk* in three flavors; Pierre's French Ice Cream Co. *Lite Gourmet Ice Milk* in six flavors, 95 percent fat free and with one-third fewer calories but with "three times more calcium than regular ice cream or ice milk."
- Brigham's Inc. introduced *Light Ice Milk* in flavors including "assorted chocolates."

Health and fitness-conscious consumers who want still fewer calories and fat are attracted to frozen fruit bars and other fruit-based frozen products. However, this remains a very small segment of the total market, according to the International Ice Cream Association. Some of the latest market entries:

- Castle & Cooke of Hawaii launched *Dole Fresh Lites Fruit & Juice Bars* that are available in raspberry and pineapple-orange flavors. Sweetened with Nutrasweet, the bars have 25 calories each. *Dole Fruit 'N Yogurt Bars* are made with 100 percent "natural" ingredients. *Dole Chocolate Fruit 'N Cream* come in two varieties: banana with a milk chocolate coating and strawberry with a dark chocolate coating. Both have less than 180 calories.
- General Foods of White Plains, NY offered its *Crystal Light Cool 'N Creamy Bars* in orange/vanilla.
- Hendrie's, Inc. of Milton, MA, a division of Hendrie's Frozen Foods, Inc. introduced the *Hendrie's Citrus 'N Berry Stix* and *Fudge Stix*. They are sugar-free, sweetened with Nutrasweet and contain Vitamin C. The fruit Stix have 16 calories while the fudge Stix have 30 calories per serving.

Frozen yogurt began as a fad in the mid-seventies and came to an abrupt end in 1980. However, the market has recovered to the point that two chains of franchised frozen yogurt stores sold stock to the public for the first time in 1985. Although the category is growing, it is less than ten percent the size of the ice cream market.

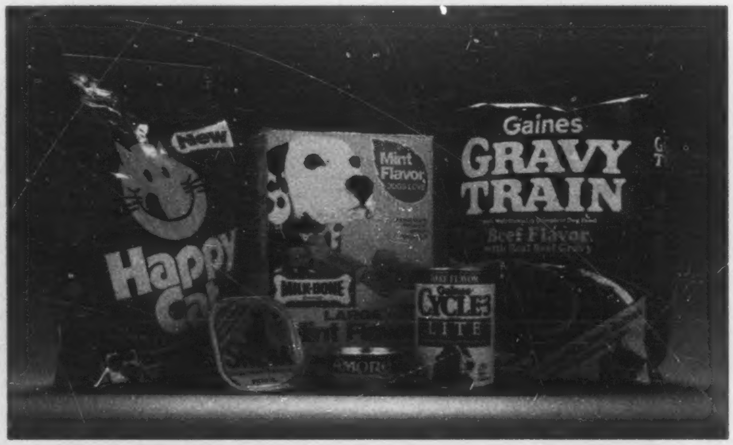
Find/SVP estimates '88 supermarket sales of frozen yogurt to range between $35 to $50 million, or five percent of total frozen-yogurt sales (most is sold by specialty fast-food chains). SAMI/Burke reported '87 sales of frozen yogurt at $26.4 million, up 185 percent from a year earlier.

The International Ice Cream Association's most recent figures combine yogurt, pudding pops and other frozen dietary products into the same category. This category in 1987 showed total production levels of 38 million gallons compared to 35 million in 1986. The Dannon Company of Glendale, CA was a pioneer in the regular yogurt cate-

Pet food sales
(in millions of dollars)

	1986	1987	1988
Dog Food			
Wet	828	851	890
Dry	1,750	1,740	1,800
Semi-moist	200	182	165
Snacks	340	372	402
Cat food			
Wet	1,120	1,160	1,210
Dry	748	753	800
Semi-moist	245	223	214
Snacks	22	26	34

Source: SAMI/A Service of Arbitron



Sheba and Amoré are two of the latest offerings in gourmet pet foods. Other new releases include Happy Cat Crunchy & Meaty, Gravey Train Beef Flavor, Gaines Lite Dog Food, and Mint Flavored Milk Bone Biscuits.

gory and is now pushing the frontiers of what it claims is its 30 percent share of the market into the freezer case.

• *Dannon Soft Frozen Yogurt* debuted with no artificial ingredients, starches or preservatives. The product has half the calories and twice the calcium of most ice creams. Flavors include: Blueberry; Peach; Cappuccino; Cheesecake; Chocolate; Lemon Meringue; Peach; Pina Colada; Praline Pecan; Raspberry; Strawberry; Strawberry-Banana; and Vanilla. Dannon also introduced *Frozen Yogurt-On-A-Stick* bars in five fruit flavors containing real fruit and only 50 calories per 1.75-oz. bar. It also rolled-out *Soft Frozen Yogurt* mix in 12 flavors with no gums, starches, colors or "artificial anything" for soft-serve machines. "This product contains half the calories and twice the calcium of most ice creams plus it's low in fat and cholesterol," said Georges Casala, president & CEO of Dannon. Soft Frozen Yogurt contains 100 calories per 4-oz. serving (except for chocolate, which contains 120).

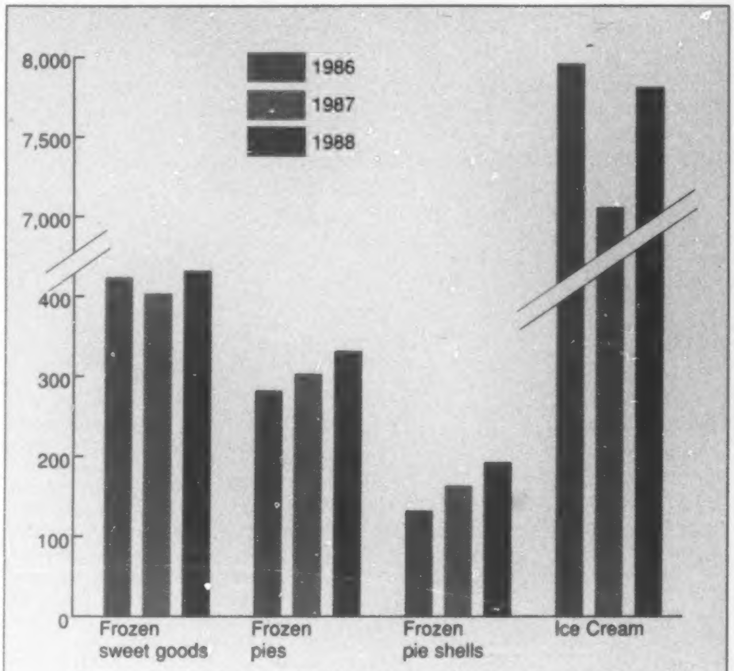
• Broughton Foods Co., Marigold Foods, Blue Bell Creameries, French American Ice Cream Co., Tim Torres Enterprises and Elan Foods also rolled-out frozen yogurts in several flavors while Alta-Dena Certified Dairies introduced frozen yogurt mixes for fast-food operators.

• Elam Mills of Hollywood, FL *Super-Premium Frozen Yogurt* compared its taste with premium ice cream but added its yogurt has "half the calories and 80 percent less fat" than ice cream.

• General Mills *Yoplait Soft Frozen Yogurt* is available in: Chocolate Chip; Coffee; Peach; Strawberry & Banana Swirl; Strawberry; Raspberry; Cherry; Mixed Berry; Banana; Vanilla; Blueberry; and Chocolate.

According to A.C. Nielsen, while the total yogurt category grew 13 percent 1986-88 the light segment boomed 89 percent and now accounts for nearly one-third of all yogurts sold. Light yogurt introductions rocketed from eight in '87 to 33 in '88 and will continue at a fast pace in '89. One reason: FDA's June '88 clearance of NutraSweet for sweetening yogurt and "yogurt-type" products. (According to FDA standards of identity, a "yogurt-type product" does not contain a carbohydrate sweetener.) Kroger Co. immediately launched *Kroger Lite*—a non-fat real-dairy yogurt-type product containing fruit and sweetened with NutraSweet—in six fruit flavors. According to Kroger, the product is low in cholesterol and contains only 120 calories per 8-oz. cup, "half the calories of regular yogurt." General Mills followed in January of this year with *Yoplait Light*, "the first nationally-branded nonfat yogurt sweetened with NutraSweet." Available in five fruit flavors, Yoplait Light contains only 90 calories per 8-oz. cup—"about 150 fewer calories than the leading lowfat yogurts...without sacrificing taste and texture," said Product Manager Randall Laco.

Frozen dessert sales, 1986-1988
(in millions of dollars)



Source: SAMI/A Service of Arbitron; International Ice Cream Association.

• Meanwhile, Weight Watchers introduced four varieties of *a la Francais Nonfat Yogurts*.

• Johanna Farms rolled-out five flavors of *La Yogurt 25* nonfat yogurts.

• Springfield Creamery unveiled *Nancy's Lowfat Yogurt* in eight flavors plus a nonfat variety.

• Alta-Dena Dairy introduced four flavors of *Fruit on Bottom Nonfat Yogurt* and three flavors of *Espirit Lite* nonfat yogurt.

• The first known fiber-fortified lowfat yogurts debuted: *Darigold Lowfat Yogurt* in two flavors, from Darigold, Inc.

As frozen yogurt continues to grow, a few products are presenting themselves as alternatives to yogurt. Products such as kefir, tofu, fromagg frais and leben are new arrivals. Mehadrin Dairy Corporation presented its leben as a "cultured dairy product that dates back to the ancient Middle East." Flavors include: Chocolate; Plain; Strawberry;

Several popular brands were the object of product extensions into the frozen dessert category, including 3 Musketeers, Sweet 'N Low and Betty Crocker brownies. Duncan Hines Tiara Dessert mix promised to be a premium treat with fewer calories while Pepperidge Farm paraded regional favorites from its American Collection.

and Vanilla.

Americans are also warming up to premium desserts found outside of the freezer. Sales of premium baked goods in 1987 were $2.94 billion and are expected to reach $4.25 billion by 1991, according to FIND/SVP. The category is divided into six areas: premium and superpremium packaged cookies, packaged soft cookies, cookie store cookies, frozen and shelf-stable cakes and pies, bake-at-home mixes and doughs, and goods prepared in in-store bakeries. FIND/SVP market studies report that some products are "premium" only because they are marketed that way. The image of quality (actual or perceived) is what attracts consumers to these taste-bud treats. New desserts include:

- Pepperidge Farm, Inc. of Norwalk, CT introduced frozen single-serve *Pepperidge Farm American Collection Desserts*. Currently the line consists of eight indulgent desserts that can either be microwaved, conventionally heated or thawed and served.
- Gourmet International Foods, Inc. of Chicago debuted *Mousse Éclat*. It is made of "all-natural" ingredients and is the only chocolate mousse served from a pressurized can. Flavors include: Chocolate and White Chocolate in both regular and low-calorie versions. Developing an aerosol can filler that could handle food with eggs as an ingredient took more than a year.
- Ativo Gourmet Confections of Emeryville, CA introduced *Ativo, the Cookie*. Half of the gourmet shortbread cookie made with chocolate chips and pecans is dipped in chocolate.

The future

Successful introduction of new food products (or any product, for that matter) involves knowing what the consumer wants before even he or she knows. The importance of convenience, nutrition and quality will continue, but changing specifics within these trends need to be addressed.

Current trends such as eating out and grazing will continue, according to a survey of Home Economists in Business conducted by Dr. John L. Stanton and Dr. Claire Boasi at the Food, Nutrition and Health Research Institute at Saint Joseph's University, Philadelphia. Ninety-two percent of those surveyed thought grazing – eating several small meals a day – would remain the same or increase, and 65 percent said we would be eating out more than we do now. Automobiles with built-in microwave ovens are a real possibility for the future. This would make eating-on-the-run even easier.

The American population is aging which will impact future food needs. According to a report on mature adults by Frost & Sullivan, Inc., the elderly spend more per capita than any other age group on food. And they are more health conscious and more concerned about nutritional factors such as salt, fat, cholesterol, fiber, calcium, caffeine, artificial additives, vitamins and minerals. But the elderly are not the only ones with increasing nutrition concerns.

"Food is more and more linked up in consumers' minds with how they feel," said Campbell Soup's McGovern at the Frozen Food Convention. "Today it is fiber, cholesterol, additives, pesticides, calories, and too much salt. Tomorrow it will be other things as medical discoveries uncover how our bodies work."

In the area of quality, consumers are becoming more discriminating. Instead of just Oriental foods, specific cuisines such as Thai will continue to become more prevalent. And we'll see more regional American products. The Saint Joseph's University survey noted new interest in southern foods.

Satisfying consumers' desire for convenience will center around microwaveable foods. A better understanding of what's happening at the molecular level when foods are microwaved is needed so product quality in this area can be improved even further. Also, improvements in the distribution system are needed for frozen and refrigerated foods. McGovern stressed the importance of simplifying product lines and concentrating on technological improvements in the total frozen food system which would then allow food companies to give more value, quality and advertising support. As food introductions level off, perhaps this is the direction the entire food industry will go.

VALVES

THE WORKHORSE OF THE INDUSTRY

Often overlooked in importance, valves are a vital, integral part of the processing cycle. And specialty valves are predicted to be a future area of investment for the food industry.

Valves in a food or beverage plant are like paperclips in the office—they're everywhere! But specifying specific valves for individual uses involves a lot more than choosing the right paperclip. It involves not only a knowledge of the process in which the valve will be used, but the types of valves available.

What are the criteria?

Specific valves handle specific requirements (see sidebar). In making valve selections, however, there are certain criteria to be considered:

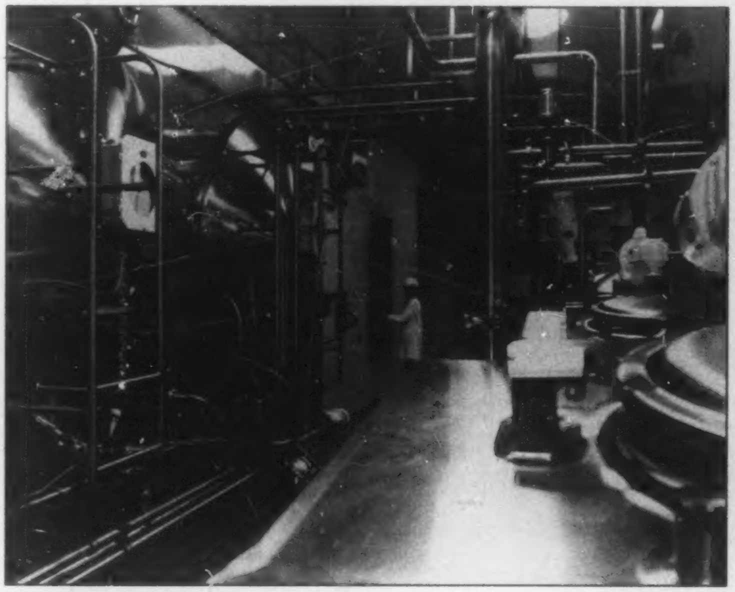
- What is the substance being handled and what is the required flow rate?
- Is the fluid corrosive or erosive?
- What is the condition under which the valve will be asked to operate?
- What temperature must the valve withstand, and what is the maximum working pressure?
- Are actuators necessary?
- What are the maintenance requirements?

"The product going through the valve is going to be a prime criteria," says Tab Orbaker, manager, process engineering at Alfa-Laval, Kenosha, WI. "There are a lot of different products and fluids to be considered, and you must know how they will react with certain materials. The product will decide the body and seat materials."

Body, seat materials

The food industry uses primarily 316, with some 316L, and even 304 stainless steel bodies for its valves because they provide cleanability and level of corrosion resistance vital to efficient operation and product integrity. "Valves have to be able to withstand higher temperatures and the cleaning fluids, which if improperly used can be tremendously corrosive, which is why 316 stainless steel is used instead of 304," says Jim Beckman, marketing manager for fittings, valves and pumps at Cherry-Burrell, Cedar Rapids, IA.

Just as important as the body material is the seat material. Today there are more seat materials available than ever before. Plastic and fluorocarbon are finding increasing use because they are tasteless and odorless and do not affect the product being processed. Plastics are being used primarily for seats, gaskets and "O" rings. But even though they are growing in use, Tancred Lopresti of Robert-James Sales, Inc., distributors of sanitary fittings, tubing and valves, sees plastic piece uses limited by "temperature



Source: Cherry-Burrell

LINDA K. FREEMAN
Contributing Editor

restraints and mechanical strengths."

In the food industry, teflon is also growing in use as a seat material. Originally seats were metal to metal, then along came silicone, rubber, etc. Now teflon offers the flexibility of use in high temperature valves. "Teflon," says Al Holton, marketing manager at Nellis-Jamesbury, Worcester, MA, "provides many advantages, such as almost universal chemical compatibility; and it is FDA approved." Nellis-Jamesbury's *Double-Seal* ball valves employ a "lip-seal" design to "build continuing sealing effectiveness into the structure of the seat itself," says Holton. The valves use a "corner seal" design employing teflon seals combined with a "radial squeeze" effect produced by the stem against the seal to give superior stem sealing characteristics, says the company.

Tri-Clover's *361 Series* of valves now uses a replacement teflon seat. "The change to a teflon seat came about because the mounted rubber seat previously used could deteriorate in high temperature or with corrosive fluids," says Al Harms, manager, project engineering for Tri-Clover, Kenosha, WI. With a teflon replacement seat, the old one can be cut off, and a new one snapped on. Replacement costs $20 rather than $150. "Teflon," says Harms, "is becoming more popular because it wears longer, resists corrosion and is easily replaced and cheaper to use."

Not all manufacturers, however, are sold on the use of teflon. Orbaker at Alfa-Laval thinks teflon is expensive to use and there is a cold-flow problem – the teflon doesn't spring back, he says, and if the teflon gets some dissimilarity, it may not resume its original seat. "Teflon is not forgiving," says Orbaker. "It can take a high temperature," he says, "and it has good stable chemical properties; but it has its drawbacks."

Elastomer seals

More common in use than teflon are four elastomers well-known for their performance capabilities in food and beverage processing applications.

- EPDM (ethylene, propylene) offers good resistance to heat, saturated steam, abrasion and aging, as well as resistance to hydraulic fluids, diluted acids and bases.
- FPM (Viton) is a fluorinated synthetic rubber for applications specific to high temperature, in particular in air and oil. Viton offers excellent chemical resistance, and good resistance to microorganisms, certain solvents, ozone. Another plus: good mechanical properties even at low temperature.
- Silicone (food quality silicone VMQ) is an elastomer with outstanding resistance to high and low temperature. There is a highly adapted formulation available for food applications.
- Neoprene (food quality neoprene C.R.) is one of the oldest synthetic rubbers, the formula of which has been adapted for food applications. It offers excellent mechanical and

A primer: the common types of valves

Multi-Turn Valves

Gate Valve – a general service valve used mostly for on/off, non-throttling service. A flat face, vertical disc or gate slides down through the valve to close it and block the flow.

Globe Valve – used for on/off service and clean-service throttling applications. It is closed by a plug with a flat or convex bottom which is lowered onto a matching horizontal seat located in the valve center. Raising the plug allows flow through.

Pinch Valve – used widely with slurries or liquids with large amounts of suspended solids. Seals with a flexible element, such as a rubber tube, that can be pinched to shut off flow.

Diaphragm Valve – closes by means of a flexible diaphragm attached to a compressor. When the compressor is lowered by the valve stem onto a weir, the diaphragm seals and cuts off flow. Used for corrosive, erosive and dirty services and is easily maintained.

Needle Valve – a volume control valve that restricts flow in small lines. Fluids passing through the valve turn 90 degrees and pass an orifice that is the seat for a rod with a cone-shaped tip. The size of the orifice is changed by positioning the cone in relation to the seat.

Quarter Turn Valves

Plug Valve – used mostly for on/off service and some throttling services. Flow is controlled by means of a cylindrical or tapered plug with a hole in the center that lines up with the flow path of the valve to permit flow. A quarter turn in either direction blocks the flow path.

Ball Valve – used for on/off and some throttling services. Similar in concept to a plug valve, but uses a rotating ball with a hole through it that allows straight-through flow in the open position and shuts off flow when the ball is rotated 90 degrees to block the flow passage.

Butterfly Valve – used for both on/off and throttling services and requires a minimum of space. Controls flow by using a circular disc or vane with its pivot axis at right angles to the direction of flow in the pipe.

dynamic properties similar to those of natural rubber. Neoprene gives a high level of resistance to all foods, to certain solvents, to dilute bases and acids, to inorganic salt solutions and to ozone.

The future is automation

"Previously, valve systems were more hand operated," says Cherry-Burrell's Jim Beckman. "Now more are automatically done." Generally, says Beckman, automated systems are more apt to be designed for CIP. The hand operated valves are more apt to be COP, cleaned-out-of-place.

The sophistication of automation, says Beckman, offers three distinct advantages:

1.) Consistency in product quality.
2.) Major labor savings.
3.) Better scheduling for the end user.

A fourth advantage is related to the bottom line—"Automation gives you the opportunity to save money," says Wilkin Chin, senior marketing specialist at The Foxboro Company, Foxboro, MA. "If you are using expensive resources, such as in the food industry, and using them in large quantity, then the percentage you can save by using an automated system becomes significant," he says.

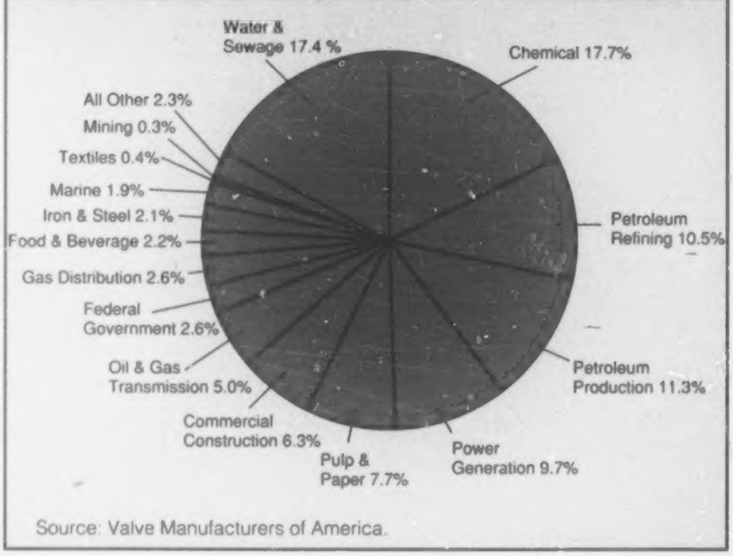
For example, says Chin, "If your control valve or control system offers 2 percent accuracy, and you can increase that to within 1 percent accuracy by using an automated system, you would decrease the cost of your goods by 50 percent."

"As an industry matures, you do a lot of inexpensive things first. It has gotten to the point now where fractions of percentages are going to increase your profitability," says Chin.

Product safety

Also affecting the bottom line of a food processor is the safety of the product he pro-

1989 Projected domestic industrial valve shipments



Source: Valve Manufacturers of America.

Self-Actuated Valves

Check Valve—designed to prevent backflow. Back flow forces the valve to close, flow in desired direction opens valve.

Relief Valve—provides protection from overloading steam or gas lines. Opens when safe pressures are exceeded, closes when pressure drops to preset level.

Control Valves

Control Valve—designed to offer accurate proportioning control of flow. Automatically varies the rate of flow based on signals it receives from sensing devices in a continuous process. Some valves are designed specifically as control valves; most types, however, can be used as control valves by the addition of power actuators, positioners and other accessories.

Specialty Valves

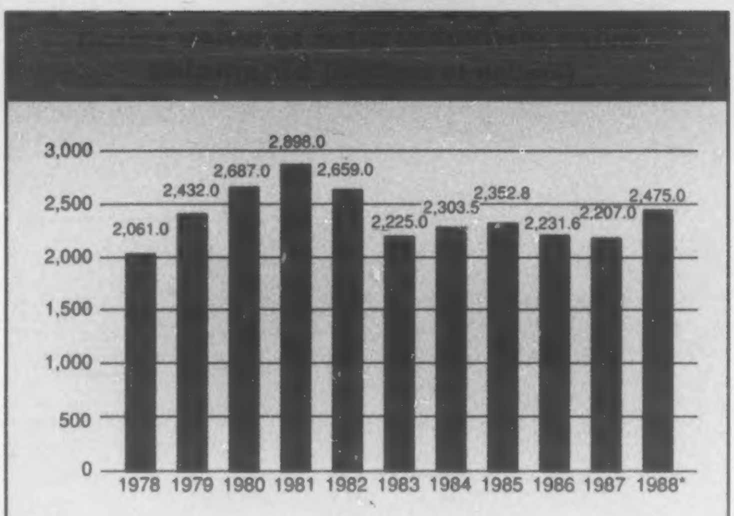
Custom-designed valves and accessories to meet the needs of processors with specific applications have been developed through the years.

Actuators

Manual Actuator—uses levers, gears or wheels to help facilitate movement, while an automatic actuator is an external power source that provides the torque to operate a valve remotely or automatically. Power actuators are a necessity on valves in pipelines in remote areas and are used on valves that are frequently turned on, turned off or throttled.

Hydraulic and Pneumatic Actuators—simple devices used on quarter-turn valves and other rotary devices. Sufficient air or fluid pressure provides the required thrust or torque and acts on a piston that is linked to the valve stem to open or close the valve.

Electric Actuators—use motor drives to provide the thrust or torque to operate a valve. These are used most frequently on multi-turn valves and on quarter-turn valves where pressurized air or hydraulic systems are not available.



*Annualized data based on nine months of 1988
Source: Valve Manufacturers Association of America.

duces. Part of that quality control involves the proper valving so that CIP and processing fluids do not mix. One answer is double-seat valve systems.

Cherry-Burrell's *Sentinel* double block and vent valves, for example, can be used with automatic valve manifolds. The Sentinel valve permits CIP cleaning of each line separately, through the valving matrix, even while running product in a parallel line. CIP fluids cannot come in contact with process fluids, eliminating the nightmare of cross-product contamination. Once two fluids mix that should not come in contact with each other, the expense of destroying the entire batch, or the day's output, is an expense no one wants to bear.

Tuchenhagen North America's *Varivent* line also includes a double seat valve. George Medal, process engineer at the Milwaukee, WI company, says the double seat valve, built to meet 3-A criteria, offers the processor a high level of protection. "Any valve is going to leak sooner or later," says Medal. In a double-seat valve, the upper and lower valve housings are each fitted with a valve seat. The chamber between the valve disks is connected to the open environment by an isolation outlet integrated into the lower valve spindle. Should seal damage occur, leaking fluid flows safely into the open. Faults can easily be detected and rectified, and leakage from one body cannot contaminate liquid in the other body.

Still lots of manuals

There is still a long way to go, however, before valving systems are predominantly automated in the U.S. "The American market is behind the European market," says William Stern, sales manager at D-fontaine, Inc., Wales, WI. "They are much more highly automated while the U.S. is more labor intensive." This, says Stern, can be attributed to the number of older plants currently in operation. However, as existing plants become obsolete and are closed down or retrofitted, the new plants will be increasingly automated. "The number of old plants (in the U.S.) is overwhelming," says Stern, who says 90 percent of the valves he sells are manually operated.

Tanaco Products of Blaine, WA, has a spring-operated, three-way plug valve in use in critical areas in dairy processing lines. This is a hand-operated, in-line valve "without the usual leakage problems or labor intensive operation," and is 3-A approved, says Annelie Hoyer, president of Tanaco. In the dairy industry, valves must have 3-A approval and the plug valve is the valve of choice. Butterfly valves, probably the most common valve in processing applications, is not 3-A approved for dairy usage.

The Tanaco *In-line* valves use chemically resistant plastic plugs which can be thoroughly cleaned in place without removing them from the bodies, hence "cleaned in line."

The result: elimination of the labor costs of manual cleaning, possible contamination and damage to the equipment. The valve can be used with various operating pressures and different product viscosities. The valve bodies are made of 316 stainless steel, and all other parts of the valve and actuator are of stainless except the plastic plug which is chemically inert, resistant to 350°F, steam sterilizable, lightweight, nonabsorbent, nontoxic, tasteless and odorless and requires no lubrication.

Alfa-Laval's automatic constant-pressure modulating valve type "CPM" evolved as a way of controlling upstream pressure or downstream pressure in a process line, says Tab Orbaker, and operates without the use of any advanced control system. "You can set the regulator to a set pressure and leave it," says Orbaker. It is sanitary, can be cleaned in place and is designed for a plant not fully automated. The required product pressure is preset by means of the pressure reducing valve. The product pressure is indicated on the pressure gauge. The valve reacts immediately to any alterations of the product pressure and changes position so that the preset pressure is maintained. Says Orbaker, "Set it...and forget it."

Butterfly valves, as noted above, are per-

VALVES

According to figures from the Valve Manufacturers Association of America, total imports of industrial valves increased by 32.1 percent during the first six months of 1988. Valve bodies and parts constitute a major portion of the total import picture, accounting for 27 percent of the total in 1988.

Import share of U.S. industrial valve market

1984	15.7%
1985	18.8%
1986	22.7%
1987	24.5%
1988	29.7%

Source: Valve Manufacturers Association of America

haps the most common valve in use in the food industry and can be either manually or pneumatically operated. All valve manufacturers—Defontaine, Cherry-Burrell, Alfa-Laval, Robert-James, Tri-Clover, etc. provide butterflies to the industry. Although they will remain the workhorse of the industry, plug valves may be making a comeback.

"At first," says Tancred Lopresti of Robert-James, "in our part of the business there was a shift from plug valves to butterfly valves. Now I see a trend away from the manual butterfly toward the plug valves," he says.

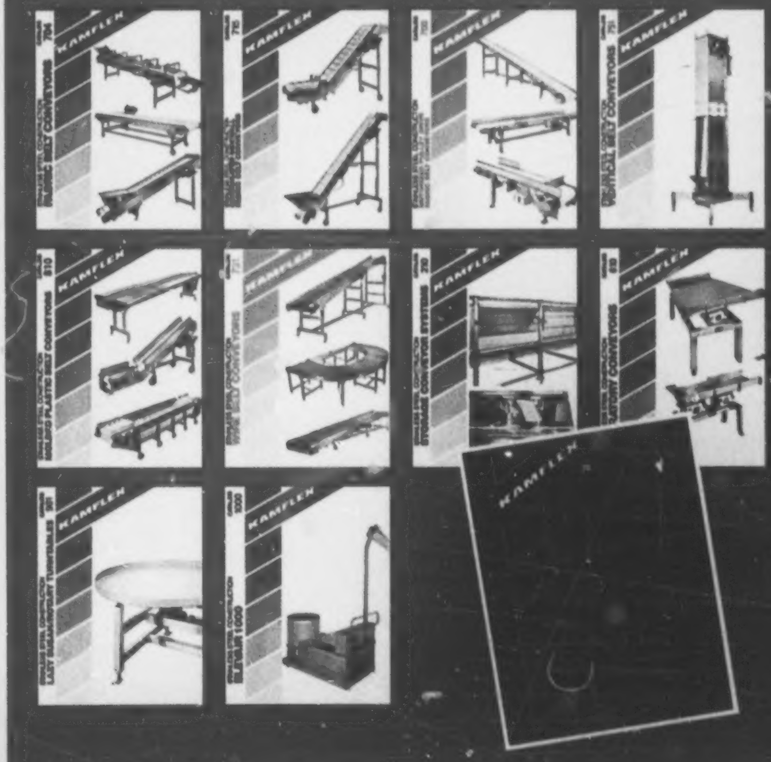
Other trends

Another trend in the valve industry is overall optimism. From 1982 until about mid-1987, the valve industry experienced difficult times.

"The industry was flat," says Holton at Nellis-Jamesbury, "and there was little plant expansion. People were using bandaids and paperclips to hold things together."

Things have turned around since then, however, as manufacturers experienced better results in the latter part of '87, a stronger '88 and see reason for great optimism in 1989. It is the consensus that 1989 will be a strong year for plant construction and expansion, which means a strong year for equipment manufacturers. The Freedonia Group, Inc. of Cleveland, OH forecasts an "above-average 6.2 percent per year (growth) through 1991," backing up the industry-wide optimism.

Out of the five year stretch of hard times, a strong valve industry emerged. "The marginal producers didn't stay in business,"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says Al Holton. Other manufacturers were merged or acquired, leaving an industry "lean and mean" and poised to respond to food processing needs.

The challenges

Although valves haven't evolved much over the past decade or two, there are still needs in the food processing area for valve manufacturers to fill.

One is a higher level of automation. Cherry-Burrell's Beckman sees "more automated systems coming online." Continuous processes are more apt to use an automatic system; the traditional batch process is less sophisticated, he says. But as the industry continues to move toward more continuous batch processing, the need for automation grows.

Processors are also looking for more valves to handle particulate and viscous products. As these products grow in popularity in the marketplace, there is a greater need to have a wider range of valves to handle production requirements.

Several manufacturers all cited the same challenge facing the industry...and that is in the area of butterfly valves. "Someone needs to develop a 3-A acceptable butterfly valve," says Alfa-Laval's Orbaker, "to handle very large particulates." To date, no one has been able to develop a butterfly valve for dairy plant applications that has the stamp of approval from 3-A.

"I think the next generation of sanitary valves will probably look quite different from anything we have today to meet the criteria and the governmental restraints imposed on the food industry," says Foxboro's Chin.

Specialty valves will be an area of investment for the food industry, says Chin, with valve manufacturers being asked to respond to specific requests to design valves to fill a particular need that is not currently being addressed by any general valve manufacturer. "The food industry is very creative for this type of work," he says.

Perhaps the next generation of valves will include that 3-A approved butterfly valve everyone wants. With the food industry in a position to invest in new equipment, and the valve manufacturers ready to respond to market needs, it's only a matter of time.

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COVER STORY

Because of improvements in barrier polymers, many plastic packages now rival the excellent shelf life and barrier properties that glass and metal have always provided.

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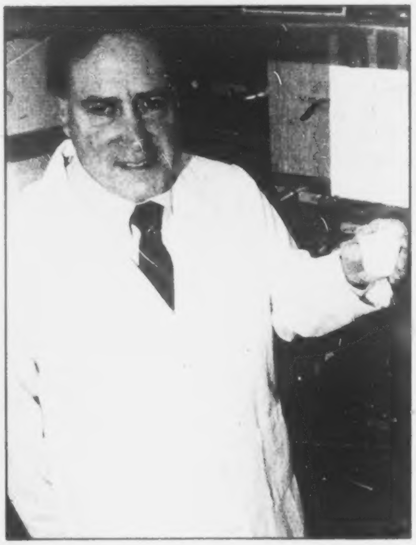

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In addition to manufacturing concerns, regulatory issues of food safety and package integrity are becoming increasingly important.

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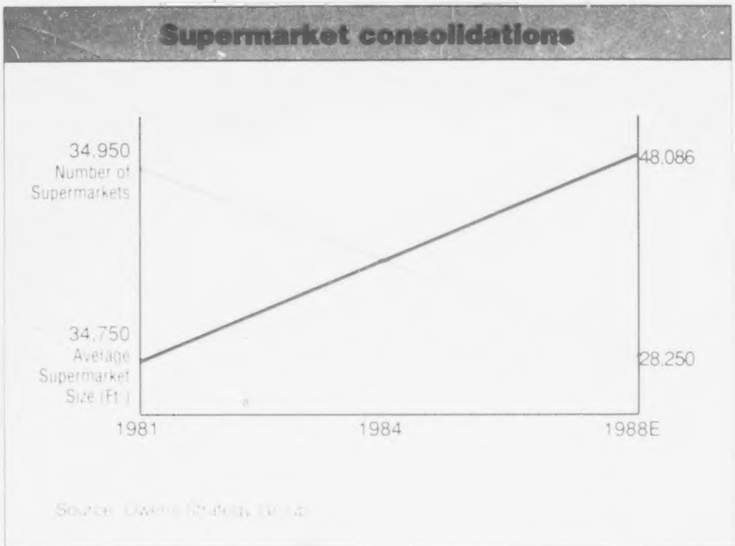
Research identifies strategies for regaining leverage from retailers


Supermarket consolidations

Source: Owens Strategy Group

The amount of food stores has dropped as size has grown. This consolidation of the market has presented processors with new challenges.

Industry trends have shifted the balance of power in distributing and marketing food products from manufacturers to retailers, but manufacturers can employ six strategies to regain some of that "channel leverage," according to a study by the Chicago management-consulting firm Owens Strategy Group, Inc.

Manufacturers historically held channel leverage due partly to the tremendous advertising and promotional budgets they deployed to support retailers but "this has all changed within the past decade," says Peter J. Cochrane of Owens Strategy Group. Retailers have awakened to their new power and "manufacturers have been seriously impaired as a result," he added. "Unless food manufacturers are able to regain channel leverage, they may become chronically unprofitable."

Industry trends

Reasons for growing retailer leverage, said Cochrane:

- *Low-priced alternatives* such as generics and private labels have weakened traditional brands. "Although the penetration of house brands has leveled off, the damage has already been done—both consumers and retailers have a heightened sensitivity to price."
- *Consolidation*, resulting in fewer, more powerful retailers in most geographic markets. Owens' research verifies that 42 of the 53 current Selling Areas Marketing, Inc. (SAMI) markets are dominated by three or fewer retail chains. "It is now almost impossible for a manufacturer to have significant share if its brand is not offered by the major retailers," Cochrane points out.
- *Advances in information technology* incorporating scanners to track sales and profitability of individual brands—as well as the potential value of various retailer practices—with remarkable speed and accuracy. "This information provides retailers the confidence to discriminate against underperforming brands," says Cochrane.
- *New retail formats* offering greater variety of foods and services (such as expanded deli departments with more refrigerated fresh foods and in-store food service) in response to changing demographic patterns. These have become important components of retail sales and profitability, reducing the retailer's reliance on suppliers of traditional packaged products.

Implications for processors

These trends alter the relationship between manufacturer and retailer, Cochrane continues.

In many markets, retailers now seek to dictate business terms such as product assortment, pricing, invoice terms and promotional support. Some retailers are flexing their new muscle by demanding nationwide uniform pricing, by charging "slotting allowances" to get a new product on their shelves, by requiring more local advertising, by pressuring manufacturers to guarantee their sales by buying back unsold inventory. Some brokers and distributors are "diverting" lower-cost merchandise intended for regional promotion to markets where it can be sold at higher prices. (An entire new business has grown-up around the practice of diverting, with "arbitrageurs" handling diversions and profiting from the price spread, said Cochrane.)

Retailers are more discriminating in product selection, particularly size and flavor varieties, and try to boost margins by reducing the costs of holding, handling and promoting inventory. Chains are thus pressuring manufacturers to improve credit terms, accelerate distribution and bear more promotional costs. "The number and value of reduced-price deals has escalated to the point where manufacturers are losing control over pricing their own brands," says Cochrane. "For some manufacturers, the battle has become one for survival, not just one of differentiation."

Regaining leverage

Cochrane's research identifies six basic strategies applied by "progressive companies" to regain channel leverage:

1.) *Increase productivity and reduce costs.* Generics and private labels highlight the most common weakness of branded-food companies—high costs. It has been demonstrated, however, that costs can be reduced while quality is maintained.

2.) *Build strong brands.* A strong consumer franchise derived from one or more strong brands is an important consideration for retailers. This means continued investment in advertising and promotion by manufacturers even though short-term margins may suffer. If a manufacturer enjoys a cost advantage relative to competitors, strong brands can be built while profits remain healthy.

3.) *Concentrate resources on winners.* Some products may remain uncompetitive even after efforts to reduce costs and build demand. Eventual decisions must be made whether these products should continue to receive support.

4.) *Dominate generics and private brands.* The most successful food companies have demonstrated that branded and non-branded products can successfully coexist. By attacking both ends of the price-brand spectrum, says Cochrane, retailers achieve their desired segmentation while competitors are kept under control.

5.) *Explore alternative product formats.* As retailers expand their own service formats, manufacturers should follow with appropriate product variations and service alternatives. One example: new fresh-food entrees for deli departments. "Competitors who remain locked into only one format are not only foregoing growth opportunities but are risking attack from other competitors as well," Cochrane points out.

6.) *Market to the trade.* Manufacturers must market their products to retailers with the same zeal they market to consumers, says Cochrane. Examples: showing retailers how their products can boost DPP (direct product profit); front-end merchandising aids to help retailers gain extra impulse sales.

"With no coherent strategy for responding to retailer leverage, food manufacturers will gradually lose control over marketing and distribution of their products. Regaining channel leverage should be a high priority," Cochrane concludes.

Artificial Intelligence becomes an item on foodservice menus

The pressure to perform better is being put on processors not only large supermarkets. All channels are getting into the act. For example, "Expert" Artificial Intelligence (AI) programs being applied to computerized process control in food plants may soon be applied by food-service operators to help them control food costs, according to Washington State Univ. (Pullman, WA). An expert AI program called the *First Food Costs Expert*, developed by Dr. Lothar A. Kreck of the university, will be marketed to business software companies.

Expert AI programs simulate the thought processes of an expert in a given area. Kreck wrote the program "because food cost control is not always clearly understood by some operators." Food costs can equal half of sales income, he added, so a small decrease in food costs can translate directly into profit. To use the system, the operator first enters his ideal (or theoretical) food costs, actual food costs and budgeted food costs as percentages of sales income. If these are not equal, there is a problem, and the system guides the operator through questions based on Kreck's "Golden Rules" of cost control grouped by functions such as purchasing, preparation and storage. Questions answered "no" represent rules the operator is not following and can be printed out as a plan of action.

Kreck taught classes in food cost-control for 25 years.

Federal agencies join efforts to rebut alarm raised regarding Alar

"The federal government believes that it is safe for Americans to eat apples, and the responsible federal agencies are working together to reassure the public of this fact," said FDA, EPA and USDA officials in a joint statement March 16 rebutting a widely-publicized report by the National Resources Defense Council (NRDC) that cancer risk from the preservative *Alar* is 100 times greater than EPA estimates, and that "children face a massive public health problem from pesticide residues in food."

The rebuttal statement was released by FDA Commissioner Dr. Frank E. Young, EPA Acting Deputy Administrator Dr. John Moore, and USDA Assistant Secretary John Bode. "EPA and others have pointed to lack of scientific validity in the suggestion by the NRDC that the risk (from Alar) is much greater than has been stated by EPA," they said.

Key points in the rebuttal statement:

- NRDC data claiming that cancer risks from Alar are 100 times greater than EPA estimates were rejected in 1985 by an independent scientific advisory board created by Congress.
- Alar has been used by apple growers for decades, and has been subjected to "many studies on possible harmful side effects."
- Preliminary results of an ongoing study show that a breakdown product of Alar caused certain kinds of tumors in mice. EPA is therefore developing a process to phase out Alar if the final data—which will be independently reviewed—demonstrates a need for cancellation, which could then occur by July 1990. "EPA believes the potential risk from Alar is not of sufficient certainty and magnitude to require immediate suspension of the use of this chemical," said the government officials. "Both FDA and EPA believe that Alar use over this interim period is safe and does not pose a health risk to the American public."
- FDA's food-pesticide monitoring program has found either no pesticide residues or residues far below EPA tolerance levels (*FE* March '89).
- Available data show "overwhelmingly" that apples carry very small amounts of Alar.
- Alar use has decreased "dramatically" over the past several years, and an estimated 95 percent of the apple crop was not Alar-treated in 1988.

FDA, EPA and USDA believe apple consumption poses no imminent hazard to children "despite claims to the contrary," the officials concluded. "Therefore, the federal government encourages school systems and others responsible for the diets of children to continue to serve apples and other nutritious fruit to American children."

New products account for 15 percent of specialty food sales

New specialty foods—potential for success

Category	Potential for new item success			Need for more new items	
	Below average	Average	Above average	Want more new items	Too many now
Appetizers/hors d'oeuvres	9 %	36 %	55 %	31 %	2 %
Wine	12	33	55	5	3
Candy (chocolates)	10	40	50	19	19
Candy (other)	14	42	43	15	12
Coffee/tea	10	44	46	9	10
Snacks (nuts/chips, etc.)	13	41	46	22	10
Pasta	10	46	44	13	9
Cheese	7	50	43	16	2
Cookies/cakes	9	48	43	17	11
Beverages, non-alcoholic	9	51	40	12	14
Sauces/bases/mixes	11	46	38	16	6
Oils/vinegars/salad dressings	9	55	36	6	25
Grains/rice/cereals	23	42	35	11	2
Seasonings/spices/flavorings	12	54	34	5	8
Condiments/mustards	20	51	29	7	29
Soups/stocks	17	60	23	9	2
Jams/jellies/preserves	20	57	23	4	39
Syrups/honey/dessert toppings	31	54	15	4	13

Source: National Association for the Specialty Food Trade Inc

A survey of 8,000 specialty food retailers and 1,200 manufacturers, distributors and importers examined types of new products desired by specialty food retailers and their chances for success.

The importance of new foods in the specialty food trade is increasing even though only 46 percent of these new products succeed. This is among the findings of a survey conducted by the National Association for the Specialty Food Trade, Inc. (NASFT). Eight thousand specialty food retailers and 1,200 manufacturers, distributors and importers were questioned for the survey.

New items account for 15 percent of specialty food sales, and retailers want more new items in the appetizer/hors d'oeuvre, snack, confectionery/chocolate and cookie/cake categories. Fifty-two percent of the retailers questioned stated that new items are "much more important" today than five years ago. And 22 percent said that they were "somewhat more important" than five years ago. Only 3 percent felt that new product had become "less important."

The survey also found that both retailers and manufacturers agreed that health/diet and convenience packaging will be the two primary factors influencing new item success in the 1990s. Other factors—such as being shelf stable, microwaveable and single serving—will also contribute to a product's success.

A host of new products available to specialty food retailers was seen at the 14th Winter International Fancy Food and Confection Show, held March 19 to 21, 1989, at the Moscone Center in San Francisco. The exhibit space covered 129,000 square feet, a six percent increase over the show held in San Francisco in 1988.

Convenient and/or healthy foods

Appealing to the desire for convenience packaging, Reese Finer Foods, Bloomfield, NJ, introduced *Microwave Nach-Os*. This combination of tortilla chips and cheese is prepared in the microwave oven in 30 seconds. Also new from Reese, was *El Rio Fajita Seasoning Mix* to simplify the preparation of fajitas. Skirt steak, chicken or shrimp can be used with the seasoning mix.

New "healthy" products were especially popular at the show. *Gift of Bran* is a new 100 percent rice bran oil available from Select Origins Inc., Westhampton Beach, NY. The label states, "This unique oil may help reduce cholesterol as part of a low fat and low cholesterol diet." Rice bran oil has been a popular cooking oil in Japan for nearly fifty years, but is new to the U.S.

Another new bran product—*Oat Bran Pasta*—hailed from Edward & Sons Trading Co., Inc., Union, NJ. This pasta contains organic stone ground whole wheat and brown rice, and features 25 percent oat bran. Fettuccini and rotelli varieties are offered.

Also in the "healthy" area were *Soy Nuts* which have a soft crunchy texture. Recommended as a topper for ice cream, salads or alone as a snack, these nuts are available from Smoky Valley Grains, Marquette, KS.

Westbrae Natural Malteds was introduced as having half the fat of a shake while being "thicker and richer than ever." Made from water, soybeans, brown rice syrup and other ingredients, this drink contains no gums or thickeners. The drinks are available from Westbrae Natural Foods, located in Emeryville, CA.

A new product with reduced calories was introduced by the Sandoz Nutrition Corporation, Minneapolis, MN—*Featherweight Sweet Pretenders*

Featherweight
Sweet Pretenders
CHOCOLATE PUDDING
NET WT 9 OZ

Ready-to-serve puddings under the Featherweight brand were introduced in three varieties—butterscotch, chocolate and vanilla.

A canned pudding offered in butterscotch, chocolate, and vanilla varieties, this product is fructose-sweetened and contains 100 calories per serving.

Sauces and condiments

An abundance of new sauces and condiments were exhibited. Cook's Classics, Ltd., Palo Alto, CA, added four new dressings and sauces to its line. *Garlic Gusto* is oil-free with only eight calories per tablespoon. *Señora Cook's Mild Mexican* blends the zesty flavors of Mexico – tomatoes, cumin, lime juice and cilantro – but leaves out the heat. *Oriental Ginger* is a blend of sesame oil, ginger, mustard and spices. And *Peach Walnut* is a creamy sauce with a touch of cinnamon.

Maison Robert Dressing au Champagne was new from Maison Robert, Santa Barbara, CA. In addition to the original flavor, natural tomato, red raspberry and cucumber pistachio are offered. Judyth's Mountain Specialty Foods, San Jose, CA, introduced a tomato based pasta sauce with pesto seasoning.

On the more exotic side were *Thai Seafood Marinade* and *Tandoori Indian Grilling Paste* from Cinnabar's Specialty Food, Inc., Prescott, AZ. The Thai marinade is a blend of tamarind, Asian citrus, chiles and soy.

Maison Robert
Maison Robert
Maison Robert
Maison Robert

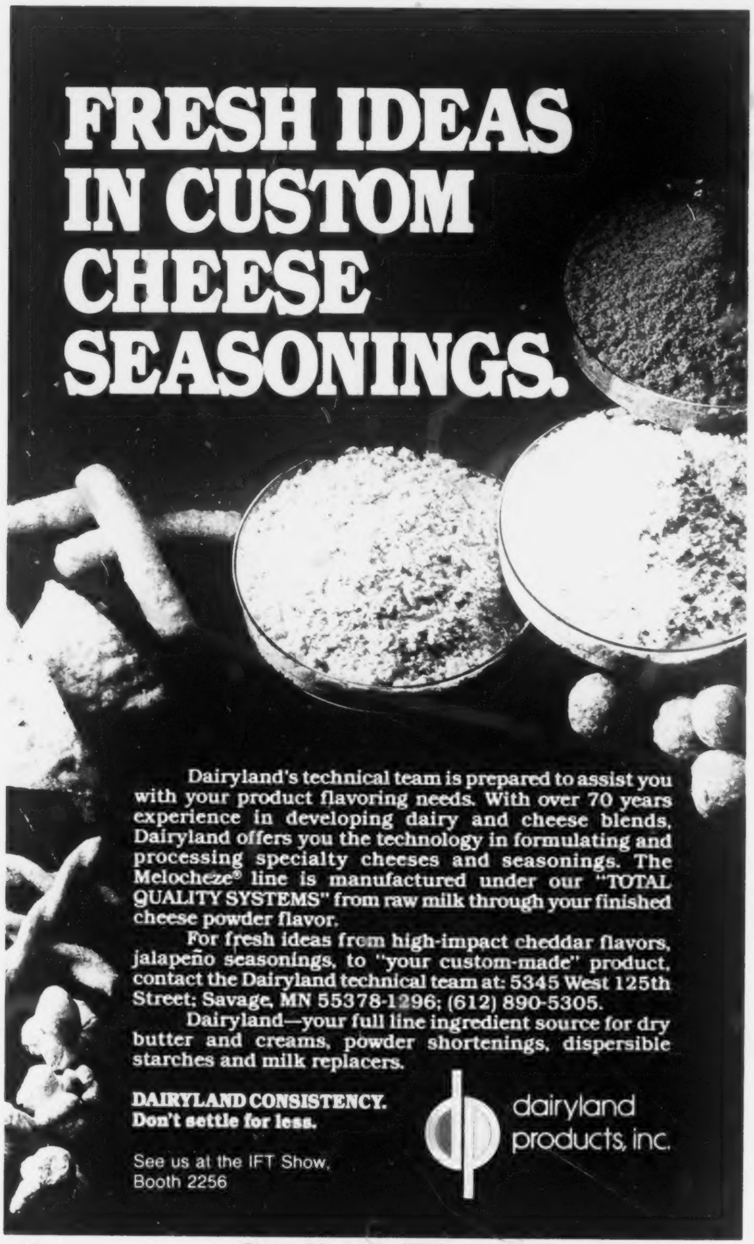
A line of new Dressing au Champagne from Maison Robert offers original, red raspberry, cucumber pistachio and natural tomato varieties.

A new imported sauce, *Lingham's Chilly Sauce*, comes from Malaysia. Slightly sweet in taste, this sauce is made from sun-ripened red chiles, vinegar, sugar and salt. It is available from Liberty Imports, Inc., Carlstadt, NJ. Also from Liberty Imports are *Mabel's Caribbean Hot Sauce with Papayas* and an even hotter *Mabel's Fiery Pepper Sauce*.

In the condiment area, Liberty Imports introduced *Baxters Lemon Curd*. It is made with eggs, butter and concentrated lemon juice. Another new condiment was *Upside Down Cajun Pickles*. Since spices settle to the bottom of a jar, these jars are kept upside down so the pickles at the top always have the fullest flavor, according to the manufacturer, Metairie, LA-based Upside-Down Cajun Brands, Inc.

Confections and desserts

Five new flavors were added to the gourmet *Jelly Belly* jelly bean line: buttered popcorn, orange sherbet, tutti-fruitti, lemon meringue, and totally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Circle 23 or see FEM, p. 125

mint. From Herman Goelitz, Inc., Fairfield, CA, this line now has 40 flavors.

San Francisco-based Ghirardelli Chocolate Company introduced *The Premier Collection of Bar Chocolates*. The new collection consists of mint chocolate, milk chocolate, dark chocolate, milk chocolate with macadamia nuts, and milk chocolate with almonds varieties.

In the dessert area, a new line of *Gourmet Butters and Spreads* was announced by Moon Shine Trading Co., Winters, CA. The spreads combine nut butters with chocolate truffle sauces and are offered in white chocolate cashew creme, almond dream, milk chocolate almond crunch and semi-sweet chocolate crunch flavors. They can be spread on croissants, used to make truffles or in other applications.

New bubble gum offers unique appeal

Pool Ball Bubble Gum, a take-off of the well-recognized game, is a new product from Amurol Products Company, Naperville, IL. Pool Ball's triangular graphic display box instantly draws consumer attention. Each colorful package resembles a triangular pool rack containing six giant bubble gum balls. The product has a suggested retail price of 69¢.

Ralston
Nintendo
CEREAL SYSTEM
ZELDA
FRUITY
BERRY
NEW

Video game success and cereal combined

Ralston Purina Company, St. Louis, MO, announced the introduction of *Nintendo Cereal System* brand cereal. Under a licensing arrangement, the new cereal was created to leverage the popularity of Nintendo, which controls 75 percent of the $2.3 billion video game industry. The company's two fastest selling video game adventures are "Super Mario Brothers" and the "Legend of Zelda."

Nintendo Cereal System features two distinct cereals – packaged in separate bags – in each box. Both cereals are made from four grains and fortified with nine essential vitamins and minerals, but one bag is flavored with blueberry, strawberry and raspberry and the second bag is orange, cherry and lemon flavored.

Each bag is linked with one of the adventure games. There are five cereal pieces representing characters from the two games in each package.

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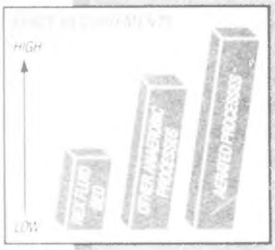

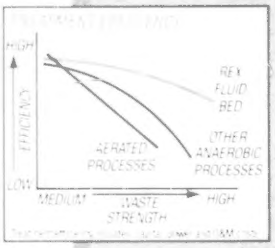

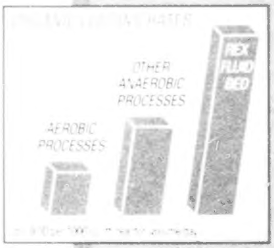

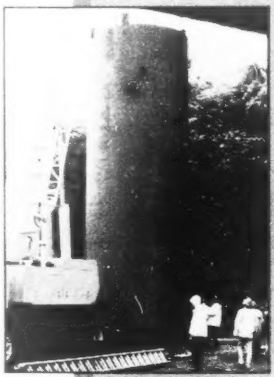

Circle 25 on Inquiry Card

New product ideas utilize...

Almonds

Expanded use of almonds as an ingredient can result in innovative new foods with added appeal.

California produces 67 percent of the average world almond crop, making almonds California's number one food export and the sixth largest U.S. food export. The last growing season (1987-88) was the best export year for California almonds, exceeding $480 million.

The exported almonds are used, in part, as an ingredient in new products. In Japan, for example, over 100 new almond items were introduced in 1987 alone. Some of the new products are: instant almond cocoa, assorted almond rice crackers, ice cream candy bars, almond fruit pizzas and slivered almond and shoestring potato snacks.

Two of the most popular new Japanese products are *Calmond*, a mixture of dried small sardines and slivered almonds, and *Almond Peptide*, a Japanese headache remedy. The need for calcium among elementary and junior high school students prompted the development of Calmond (the sardines provide calcium). Milk products are not as common in Japan as in the U.S. Almond Peptide is a protein extract from almond kernels.

In Europe, the use of almond butter as an ingredient is much more widespread than in the U.S. In fact, several European chocolate manufacturers have introduced bars with almond butter.

While U.S. per capita almond consumption is .71 pounds – the highest of all tree nuts, the California almond industry is placing more emphasis on increasing U.S. consumption. This is especially important in light of changing world economic factors.

Average volume of California almond exports

Year ending July 1	Pounds (in millions)	$ Value (est. in millions)
1980-81	187.295	350
1981-82	207.894	228.7
1982-83	177.980	231.4
1983-84	171.699	232
1984-85	266.762	312
1985-86	332.186	415
1986-87	174.011	420
1987-88	343.295	480

Source: Blue Diamond Growers

California produces 67 percent of the average world almond crop and many of these almonds are being used as ingredients in new products. For example, in Japan Calmond, a mixture of dried sardines and slivered almonds, was introduced in 1987.

The level of exports is partially dependent upon the strength of the dollar in world markets and, therefore, not as dependable as the volume of almonds sold in the U.S. Part of the effort to increase almond consumption in the U.S. involves offering an increased variety of almond ingredients and formulation suggestions for using these ingredients.

R&D personnel at Blue Diamond Growers have been actively developing new formulation ideas for using almonds and almond products as ingredients. These new products utilize a variety of almond ingredients.

Almond paste, either lightly flavored or unflavored, can add sweetness and texture to foods. Basic almond paste consists of finely ground almonds, sugar and water. Its consumption in the U.S. has climbed 15 to 20 percent annually over the last five years. Some of the foods that can incorporate almond paste are:

- *Soft-Centered Almondola Bars*: Almond paste (unflavored or regular, blanched or natural, fruit blended or all-almond) can be used as a center for granola bars. These bars could be dipped in chocolate, if desired.
- *"Adults Only" Cookies*: An upscale

chocolate mint chunk cookie incorporates almond paste in the dough.

- *Almond Flan*: A traditional Mexican custard dessert with an unusual twist of a crispy caramel crust (which incorporates almond paste) on the top and the bottom of the pudding is baked in individual serving dishes.

Almond paste powder was developed for use in foods where a dry form of almond paste is desired. The amount of almond flavor in this product can be varied. Two possible new foods using almond paste powder are:

- *Almond Tunnel Cake*: A ring of filling made from almond paste powder forms the center of a chocolate tunnel cake.
- *Almond Paste Dessert Mixes*: Almond paste and/or marzipan in powdered form can be used in dry bakery mixes for home use.

Almond butter can be used as an ingredient in addition to its use as a retail product. Several possibilities are:

- *Rocky Road Sundae*: A classic combination of chopped almonds and marshmallows in ice cream can have the added feature of a swirl of chocolate almond butter.
- *Amaretto Almond Ice Cream*: Amaretto almond butter in vanilla ice cream would have adult appeal.

Almond powder can be blanched or unblanched or, for added flavor, roasted. Almond powder can also be partially defatted for those concerned about fat content. Numerous products can be developed from this powder.

- *Almond Milk Concentrate*: A mixture of finely ground blanched almonds, water, sugar, stabilizer and flavorings results in this non-dairy drink which looks like milk. It can, in turn, be used as an ingredient to make frozen novelties.
- *Cream of Almond Soup*: Roasted blanched ground almonds, partially defatted roasted almond powder or almond milk concentrate serve as the basic ingredients in rich, creamy, non-dairy soup.

Different cuts of almonds can be used to enhance the value-added appeal of foods. Crinkle cut almonds can be used in a potato or stuffing product. Or, a salad bar topping could consist of cheese croutons, toasted blanched slivered almonds, sesame sticks and potato sticks.

Another ingredient from almonds is roasted almond oil which is becoming popular as a natural flavor. It can be used in products such as soft dairy desserts.

As competition for shelf space for new products remains stiff, using almonds for added appeal in new product development could help improve that product's chances of success.

For more information on using almonds in new products, contact Blue Diamond Growers, 1802 C Street, P.O. Box 1768, Sacramento, CA 95812. Or, circle **253** on the reader service card.

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The *BioBusiness*® database provides complete coverage of the business and industrial applications of biological and biomedical research, including information on the latest food technology findings. Fully indexed references guide you to articles describing the most up-to-date findings in brewing and fermentation, food additives and nutritive supplements, new sources of protein, processing, packaging and storage, plus much more.

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INGREDIENT BUYERS SURVEY

INGREDIENTS NEEDED FOR HEALTHY FOODS

FOOD ENGINEERING'S
EXECUTIVE
ADVISORY
PANEL

The future will bring healthier foods, improved preservation methods and biotechnological ingredients, according to FE's 1989 Ingredients Buyers Survey.

Future food research will focus on the formulation of "healthy foods," improved preservation methods and the development of new ingredients through biotechnology. This is the prediction of *Food Engineering's* Executive Advisory Panel.

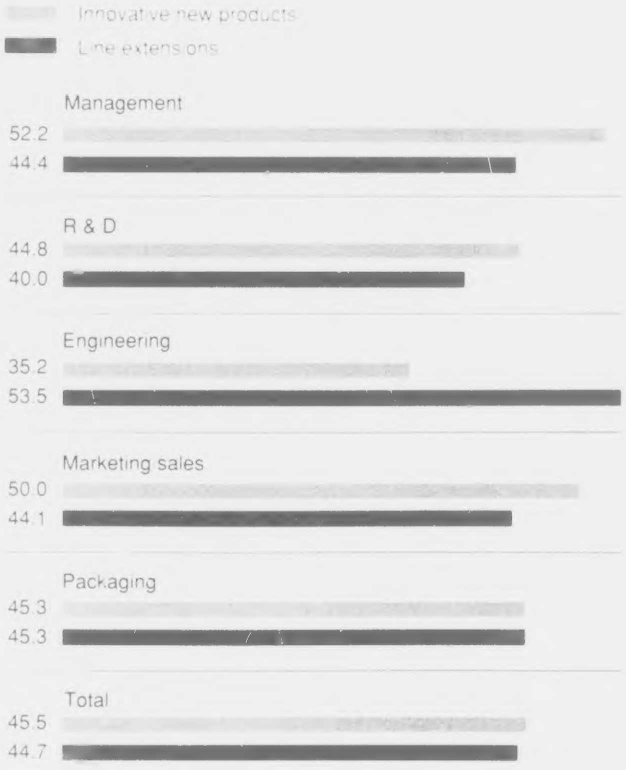
"As digestive pathways become more known in pure research, and long-range medical research produces results, we are going to see harder facts," wrote one participant. "Thus, future research in solid factual nutrition will come to be much less wooly theories."

When asked what direction future food research will take, a number of panel members specifically mentioned the development of foods with less saturated fats or increased dietary fiber. In addition, other panelists made similar predictions stating that research aimed at producing healthy foods would occur. One person saw "increased emphasis on new products or line extensions with reduced or eliminated saturated fats and cholesterol, increased use of natural ingredients, and fortification with vitamins and minerals," as part of future research.

Whatever happens, natural ingredients will be part of it. Using natural ingredients was mentioned most often as having a major influence on ingredient and product development decisions (see chart). There was a three-way tie for the second most often mentioned major influence: saturation level of fats, using pesticide-free ingredients and ingredients produced under HACCP. Other categories listed in the survey as having a

ANN E. PRZYBYLA
Senior Editor

Activity level of new product research
(Percent of panelists who indicated pace is higher than previous year.)



Source: Food Engineering's Ingredient Survey 1989

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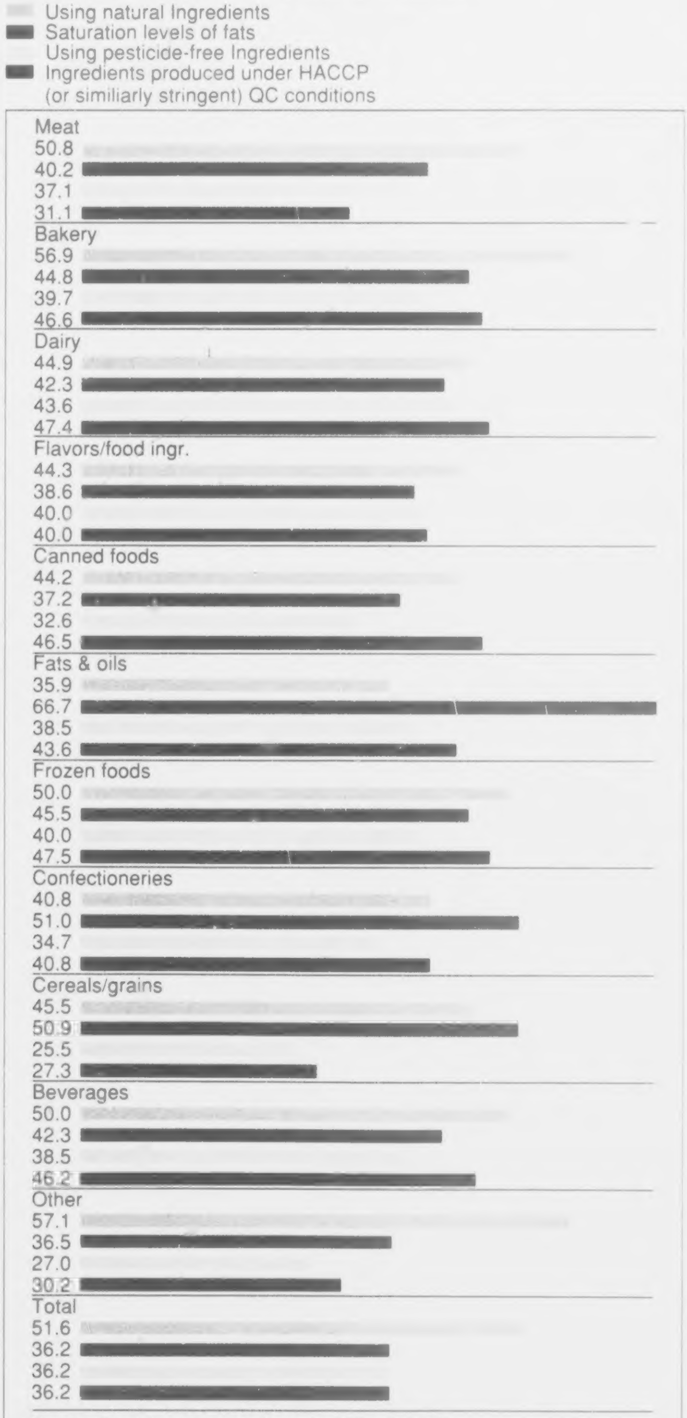
Influence on ingredient and product development decisions

(Percent of panelists who indicated these considerations as a major factor in influencing their decisions.)



Source: Food Engineering's Ingredient Survey 1989

possible influence on ingredient and product development decisions were: lessening/eliminating preservatives, vitamin fortification, mineral fortification, low- and reduced-calorie foods, reducing sodium content, reducing cholesterol content and adding fiber to foods.

Improved convenience foods needed

Future foods offering convenience were certainly part of what the panel said to watch out for; improved microwaveable products were an element of the mix, as were specific microwaveable products such as shelf-stable foods and refrigerated products in controlled atmosphere packaging. "Fresh, refrigerated foods demanded by consumers will generate new technologies," predicted one panelist.

Our panelists were also given the opportunity to comment on ingredients or ingredient systems that are needed but not yet available. Natural antioxidants or preservatives were mentioned most often. One participant asked for "natural antioxidants and preservatives that safely extend shelf life and prevent 'warmed-over' flavors."

A need was expressed for reduced cholesterol in animal and dairy products, and for a hydrogenated fat replacement (see *FE*, Feb. '89, p.83). Also to aid in formulating healthy foods, some panelists requested a wider array of non-nutritive sweeteners, good-tasting salt replacers and/or low calorie fats.

We specifically asked our panelists where their company saw problems of price, supply or current technology in ingredients. Concern with current technology was expressed most often for antioxidants/preservatives and colors, with 26.4 percent of our panelists mentioning these categories (see chart). Concern about natural flavor technology came next with 26 percent, followed by artificial flavors at 18.7 percent, and low calorie sweeteners at 16.7 percent.

Current technology was not the only concern buyers had about natural flavors. Price was also considered a problem by 29.7 percent of the panelists. The other top four categories where price was seen as a problem were: sweeteners (corn) at 24.4 percent, cheese at 23.6 percent, fats and oils at 22.8 percent and sweeteners (sucrose) at 21.5 percent. There were no major concerns about availability of ingredients though. Natural flavors and fiber sources were each noted by 15.9 percent of the panelists. Other categories were cited even less frequently.

When selecting a supplier, 89 percent of our panelists consider the quality of the ingredients a critical factor. Next most important is the availability of ingredients, with 78.5 percent considering this critical; following closely is assurance of quality safety at 75.6 percent. Suppliers' after-sales service is considered critical by 41.5 percent of our panelists; followed by price at 26.0 percent and supplier's R&D capability at 24.4 percent.

Innovation or line extension?

New product activity continues to increase, but not by the same rate as last year. In our 1988 survey, 50.1 percent of the respondents said that new product activity increased in their companies over the previous year. This year (1989) we separated new product activity into innovative new products and line extensions. In the area of research resulting in innovative new products, 45.5 percent felt that there was increased activity over the previous year in their companies; for line extensions, 44.7 percent said activity was increasing.

Not everyone within a company sees the innovative and line extensions breakout the same. While management, R&D, marketing sales and packaging people said that innovative new product research was ahead of line extension activity, the engineers in our survey disagreed (see chart). Only 35.2 percent of the engineers said that innovative new product activity has increased versus 53.5 percent who felt that only line extension activity increased.

Smaller companies spend a larger portion of their R&D efforts on innovative new products as compared to line extensions. For companies with less than 100 employees, 22.7 percent of the panelists indicated that line extension activity had increased over the previous year and 44.6 percent said that innovative new product activity had increased. In other words, within small companies innovative research increased twice as much as line extension work.

This was not the case in larger companies. Panelists from manufacturers with more than 500 employees reported a 47.8 percent increase in line extension activity compared to a 46.4 percent increase in innovative new product research. Or, a similar increase was seen in both innovative and line extension activity.

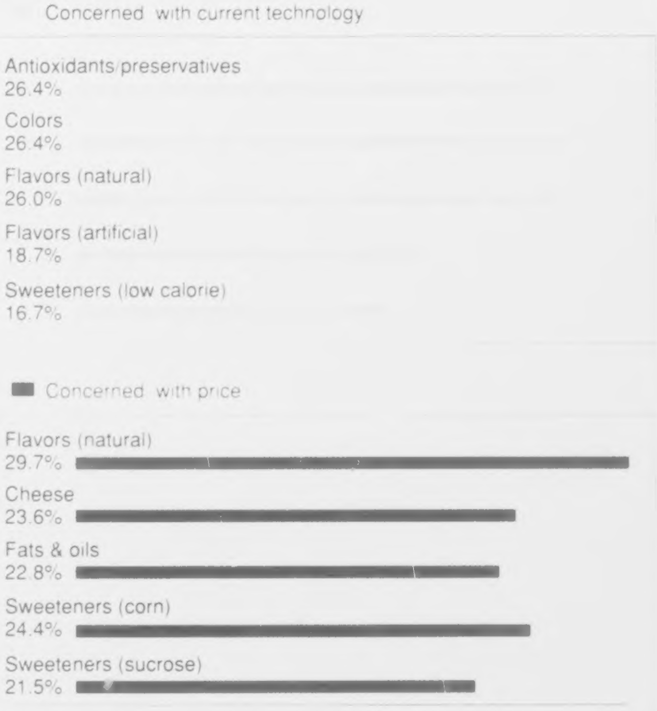
Mergers and R&D

A new series of questions added to our survey this year concerned the effect of mergers on food research. Feelings were strong in this area. For the most part, panelists indicated that mergers resulted in decreased new product activity and basic research.

"The debt burden generally causes a force reduction localized in research and development where the impact is generally not felt for years. Additionally, debt service causes a company to look for savings which generally impact on product quality," wrote one panelist. A number of other panelists said that the long-term effect would be negative. One person suggested that, "while some mergers are necessary (e.g., poorly managed companies), most appear to be ego trips for top management."

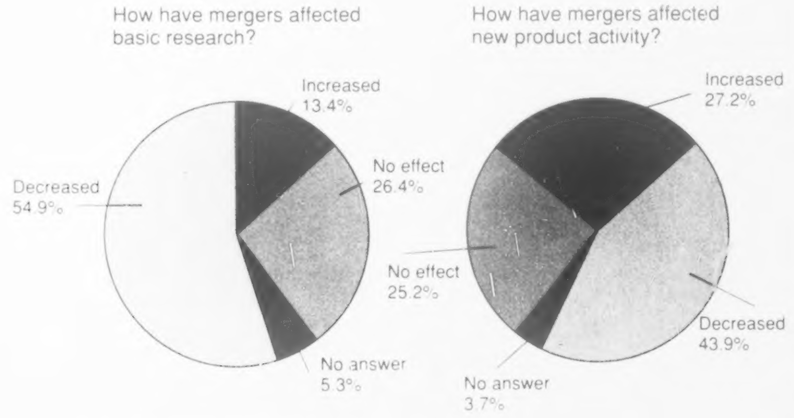
Lessening of competition was mentioned several times as one result of mergers. Panelists from smaller companies pointed out that increased pressures on the surviving companies result. "With the practice of retailers charging stocking allowances, it makes it very difficult for the small food manufacturer to compete with the big boys," said one panelist. A few panelists did say that recent mergers would make their companies more competitive.

Dissatisfaction with ingredients' price/technology level



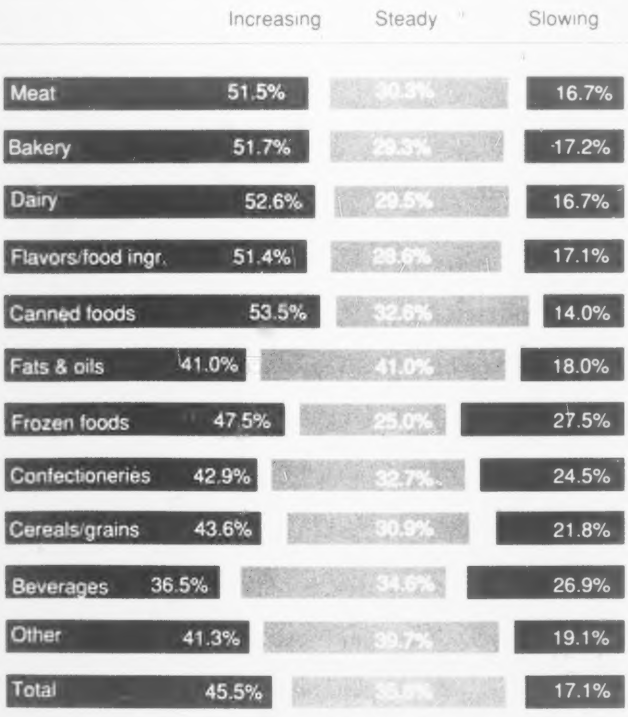
Source: Food Engineering's Ingredient Survey 1989

Mergers and food research



Source: Food Engineering's Ingredient Survey 1989

Pace of innovative new product activity by industry (as compared to previous year)



Source: Food Engineering's Ingredient Survey 1989

Several people suggested that even rumors of mergers can result in demoralization of workers – reducing productivity and quality. The majority of our panelists – 73.6 percent – said that the number of jobs are reduced when mergers occur. Although, it was pointed out that usually it is redundant positions that are eliminated and duplicate projects that are dropped. On the other hand, a number of respondents said that good people were lost due to mergers in their companies and this results in loss of company loyalty.

One panelist with particularly strong feelings stated, "I've survived a 'downsizing' just prior to being acquired by a larger company, however, many of my co-workers did not survive. That day – when over 200 jobs were 'eliminated' – was devastating. The majority of the positions eliminated were occupied by the most senior [in years] and most highly paid. They were given a package, but how does this make up for 20-plus years of dedicated, loyal service, especially when the individuals' dedicated and hard work put the company in a good financial profile making it an attractive acquisition?"

"I suppose what bothers me the most is what do I tell my children [teenagers] about how to be a conscientious, loyal, hard-working employee for some employer who might cash in on them as a result of their dedication? We've got a problem, if this doesn't stop soon our industrial/manufacturing sector is going to be third rate due to a lack of caring or work ethic," he added.

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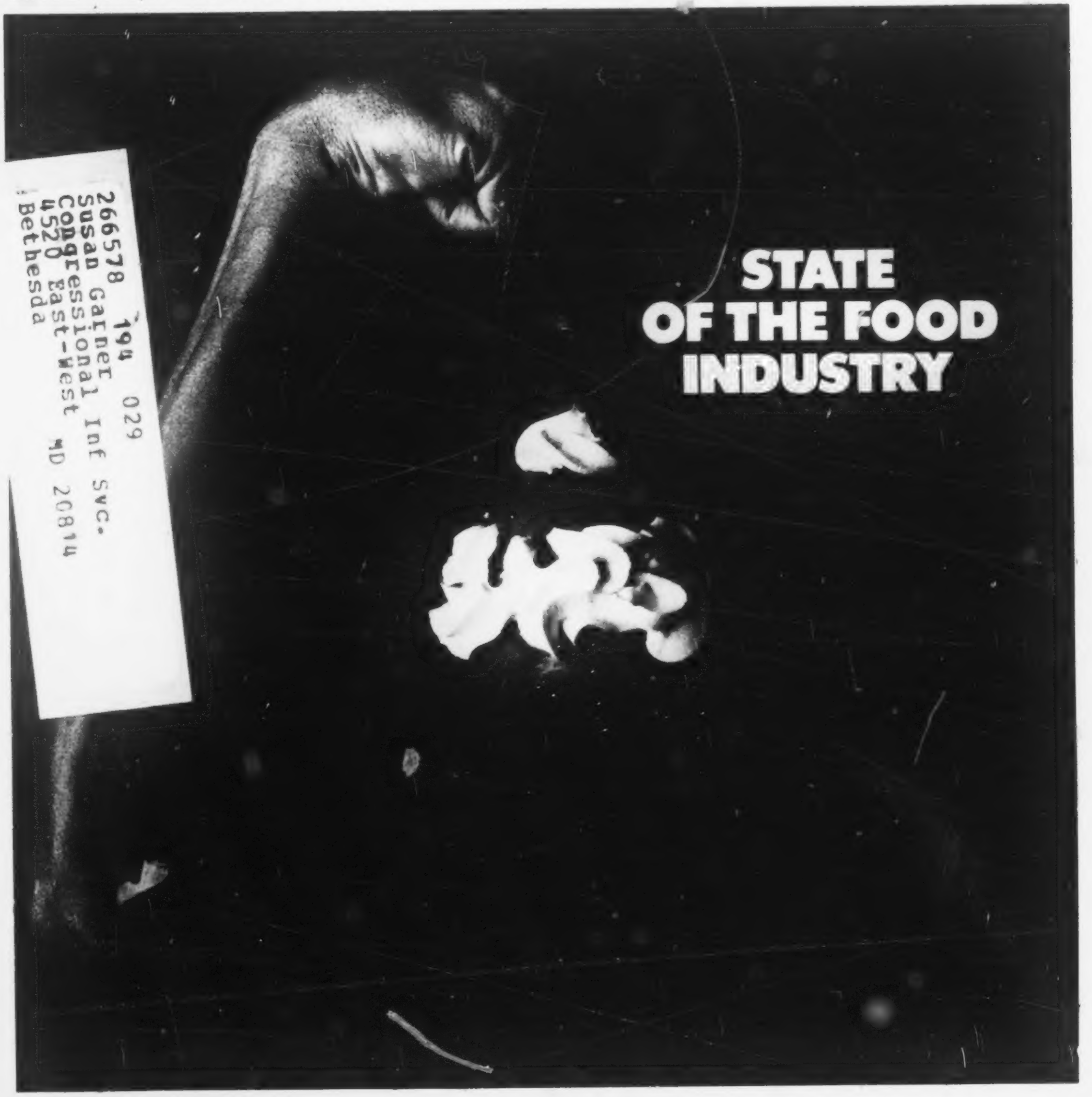

STATE OF THE FOOD INDUSTRY

266578 194 029
Susan Garner
Congressional Inf Svc.
4520 East-West
Bethesda MD 20814

FOOD ENGINEERING

COVER STORY

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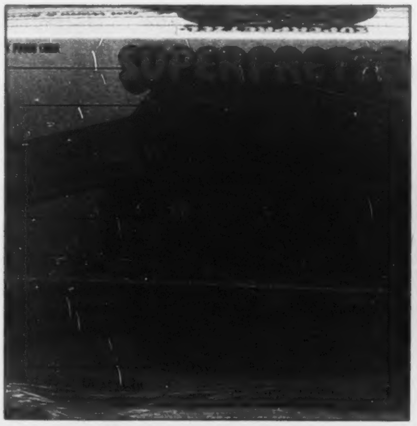

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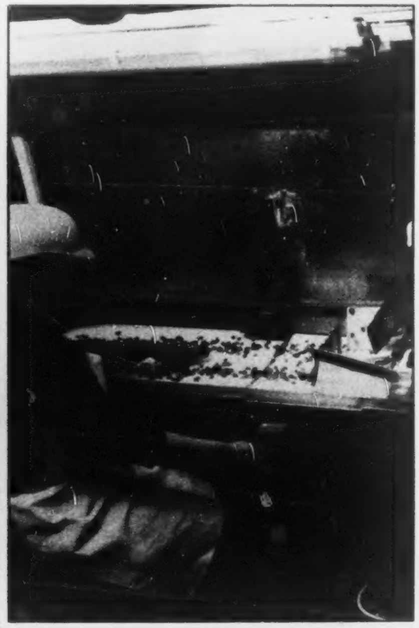

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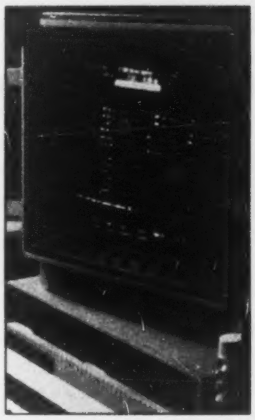

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ANALYTICAL INSTRUMENTATION

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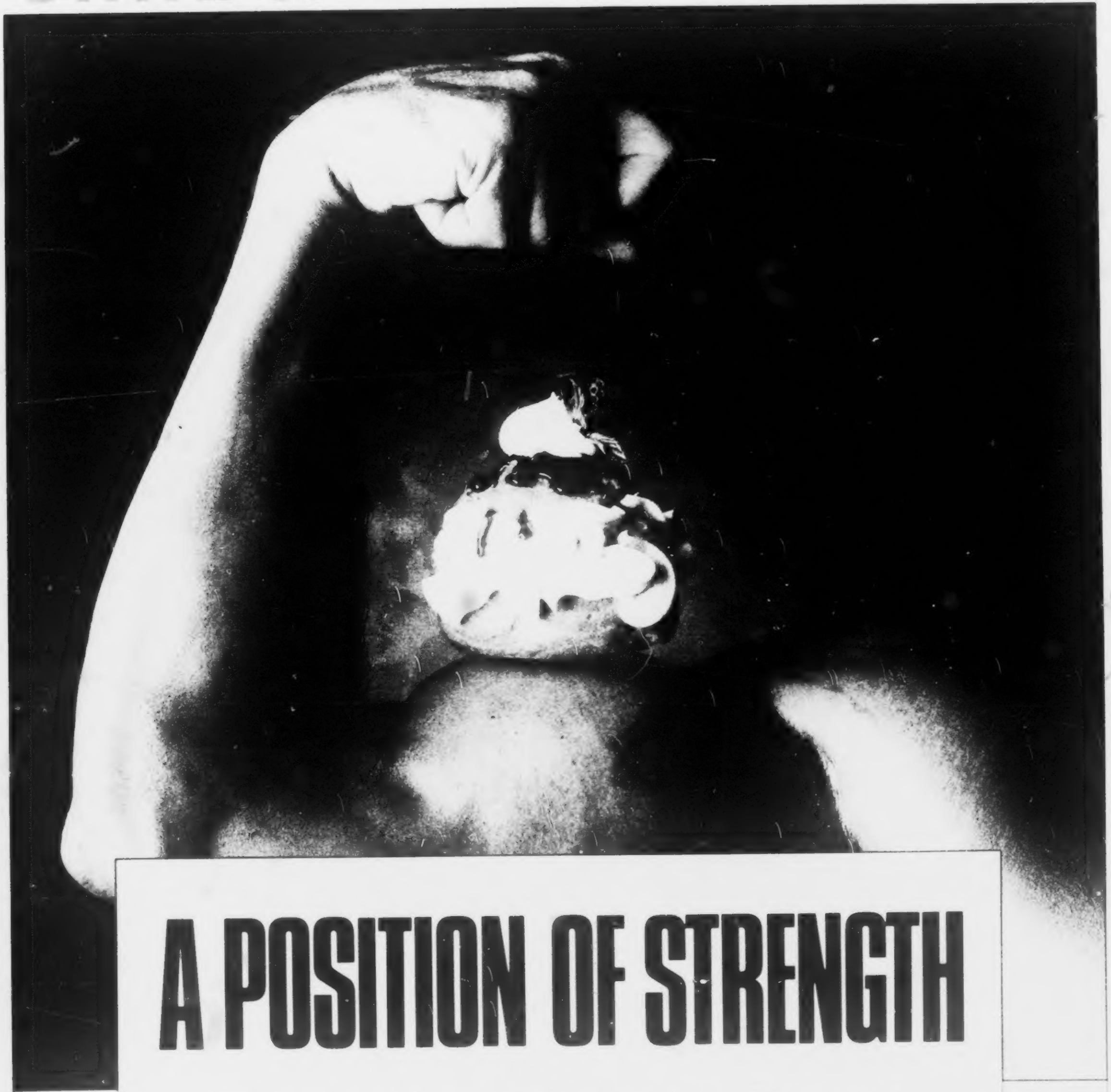


A POSITION OF STRENGTH

The name of the game is the name. Since total volume of food sold rises only one percent each year, capturing that one point is often the result of increasing the strength of a brand name.

Joyce Fassl, Managing Editor; Charles E. Morris, Midwest Editor; Ann E. Przybyla, Senior Editor; Patricia M. Dillon, Senior Associate Editor; Linda K. Freeman, Contributing Editor.

STATE OF THE FOOD INDUSTRY

The food industry has had another strong performance year. Once again, much of the whirlwind of business activity has been centered in brand names: the drive to acquire them, keep them or make them grow.

The question being raised by food and beverage industry watchers is: "How is the industry going to do when faced with an economy that is slowing down, an inflation rate on the rise, and an anticipated recession in 1990?" The consensus seems to be: "Very well, indeed."

Brand strength the key

It seems overly simplistic to say "the name of the game is the name," but it's true. In today's highly competitive marketplace for food and beverage products, where the total volume of food sold in the U.S. rises in the range of a mere one percent a year, capturing a part of that one percentage point is the driving force for much of the activity in the industry.

Fueling that drive over the past several years has been the whirlwind of activity surrounding the moves to acquire brand names, and the market strength that goes along with them. The result of all of that activity is an strong industry, well prepared to face an economy where the dreaded "I" word – inflation – has reared its ugly head. The other hated word – recession – is also being given a lot of play, and the strength of the industry, much of which is based in brand identification, will allow it to weather a recessionary storm and an economic slowdown far better than other segments of the economy.

Food expenditure index
(Food away from home)
1984 = 100

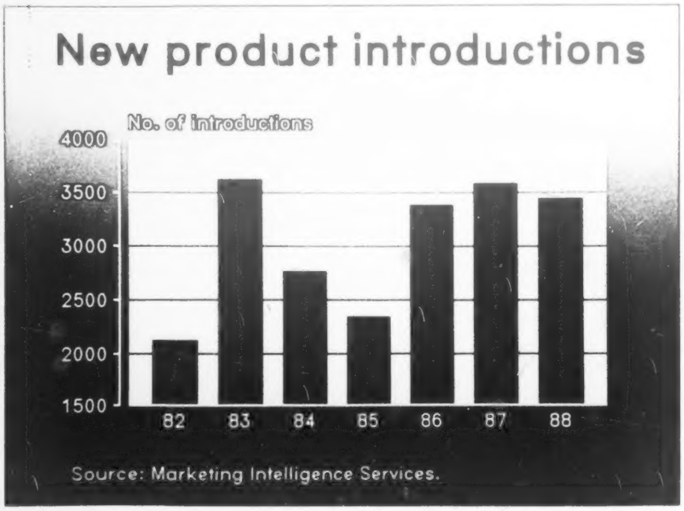
1985	100.4
1986	104.6
1987	109.0
1988	111.3

Food expenditure index
(Food at home)
1984 = 100

1985	104.3
1986	107.0
1987	105.8
1988	106.4

(Note: Expenditures are for food only. Does not include non-foods, alcoholic beverages, etc.)

Source: The Food Institute



Source: Marketing Intelligence Services.

The industry has merged and acquired itself into a lean, productive entity. Consolidation and streamlining has given rise to a food industry better able to cope with difficult economic times than ever before.

Strong stocks

The knowledge that people can put off the acquisition of other items, such as cars, boats, second homes, etc., but cannot put off the purchase of food, makes food companies one of the last to suffer from an inflationary economy. Says one analyst: "Food stocks have shown an ability to retain a good performance record, even when times are tough."

A consensus among stock analysts is that food industry stocks are still under valued, making them a good investment. This makes 1989, according to *Value Line Investment Survey*, published by Value Line, New York, NY, the ninth year in a row that food processing stocks will outperform the market averages. Many of the stocks that the analysts feel will perform well are those with the strongest brand identification: Borden, General Mills, Hershey, Heinz, and others.

Heinz, says one analyst, provides a perfect example of why food stocks are a good investment. Heinz has had consistently good earning results for more than 20 years.

Fiscal year 1989 is expected to be the *twenty-fifth* year in a row that the company's earnings have increased. This is an example of a food company that has survived past difficult economic times and is positioned, due to the ownership of not only the Heinz brand name, but of *Weight Watchers*, *Ore-Ida*, *Star-Kist* (which holds a 40 percent share of the domestic tuna market), *9-Lives*, and others, for double-digit earnings potential even if the economy gets rocky. Heinz now holds 57 percent of the ketchup market in U.S. supermarkets as well as 70 percent of what is sold to restaurants. The result: a profit margin of 21 percent, one of the highest of any U.S. food product.

Stock analysts admit it is difficult to understand the lack of perception of the value of food stocks. Until food stock prices are valued at a rate commensurate with their performance, they will continue to be an excellent investment and will be the catalyst for further takeover bids.

Mergers & acquisitions

The undervaluing of food stocks combined with the drive for brand name acquisition fueled the merger and acquisition in the food and beverage industry in 1988, some of it spilling over into 1989 with the completion of the Kohlberg Kravis Roberts leveraged buyout of RJR Nabisco for $25 billion.

The food industry can be likened to an athletic season – each year a new record falls. The RJR acquisition set a new record as the biggest deal in history, surpassing the $13 billion Philip Morris buyout of Kraft Inc.

All of the acquisitions taking place over the last year, however, weren't billion-dollar events. Many acquisitions were small or medium-sized deals, but each added strength to the acquiring company, either in the area of marketing, distribution or processing. It remains easier, and more cost efficient, to buy market share, or buy a brand name, rather than building it from the ground up.

In all, there were 652 food industry-related mergers and acquisitions in 1988 according to the Food Institute, Fair Lawn, NJ. (See accompanying chart.) Although this was 8.8 percent above the number of transactions recorded in 1987, it is less than the number of transactions in 1985 and 1986.

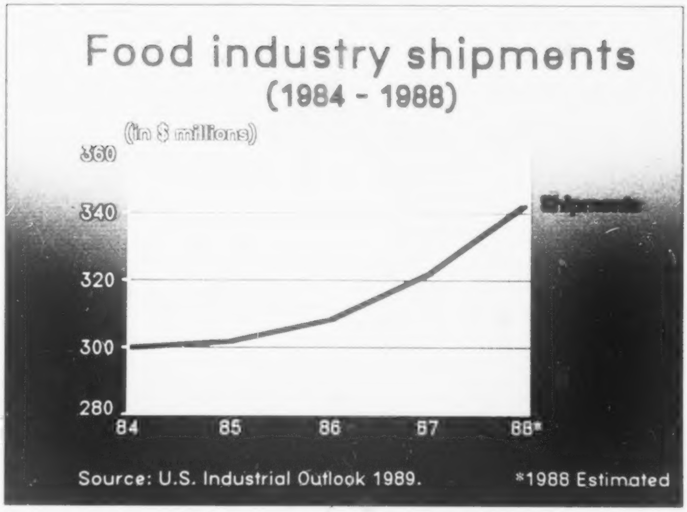
How long will it last?

Watching the activity over the past several years, with the size of the transactions growing by quantum leaps, the question arises: "How long can merger and acquisition activity last?"

"Who is left?" says Lewis Barton, president of SIGMA Quality Foods Division of Sugar Foods Corporation, whose company SIGMA Quality Foods Corporation was purchased early this year. Barton feels that "there will continue to be a considerable amount of activity, but not at the levels we have seen." Frank Panyko, vice president of The Food Institute and an industry expert on food industry mergers and acquisitions feels the same way. "I don't think we are going to see anything quite as large as the RJR deal again. However, our impression of the mega deal changes every six months."

A function of the economy

"Essentially, mergers and acquisitions are a function of the economy," says Panyko. "Any economic downturn is going to have a negative impact on this activity because prices are high – companies are going for a premium price, interest rates are high, so financing is potentially risky." Potential buyers become a little more cautious if faced with the threat of a recession. However, Panyko points out, a recession has been threatened before, but has yet to be realized.



Food industry shipments (1984 - 1988)

Source: U.S. Industrial Outlook 1989. *1988 Estimated

Grocery store price index (1982/84 = 100)

1984	103.0
1985	105.0
1986	107.5
1987	112.0
1988	116.7

Eating and drinking place price index (1982/84 = 100)

1984	104.0
1985	108.0
1986	112.3
1987	116.6
1988	121.3

Source: The Food Institute

"As long as the deals work and the track record is good," says Panyko, "there is not an overwhelming need for caution. There is always a certain amount of caution involved in any of these deals, that is why preliminary studies are done, no matter who is borrowing the money." Pending anything that shows up in the lender's own studies, there is no specific need for caution. "Once the macro-economic picture looks good," says Panyko, "then the deal is set.

"Mergers and acquisitions will continue, however," Panyko continues, "because they are getting very high rates of return." There is caution, he says, "but no more so than with any other investment which will yield double digit rates."

Along with a slower economy, another factor seen as possibly putting a brake on merger and acquisition activity would be if the Congress were to take some type of action which would make the financial rewards less attractive. One possible action mentioned has been a Congressional move to limit interest payment deduction, but nothing definitive has happened to date.

As one industry observer put it: "The activity of the mergers has been carefully positioned so as to preempt any Justice Department action by virtue of compatibility rather than competitiveness. When you study the Kraft/General Foods merger, the beauty of the strategy was that the lines merged."

Some side effects of M&A activity

The effects of some mergers really only begin when the takeover takes place. The wave of activity that has taken place making the deal happen, widens with a rippling effect as portions of the newly-merged identity are sold off to pay some of the outstanding debt. This is not true in all cases, but it is a common occurrence.

Some economists looking at an economic slowdown and a threatened recession see this as a possible problem in the future. They reason that if a recession were to occur, this could endanger the cash flows of some of these companies if it became impossible to sell parts of the newly-formed company to pay off debts.

Other problems on the horizon

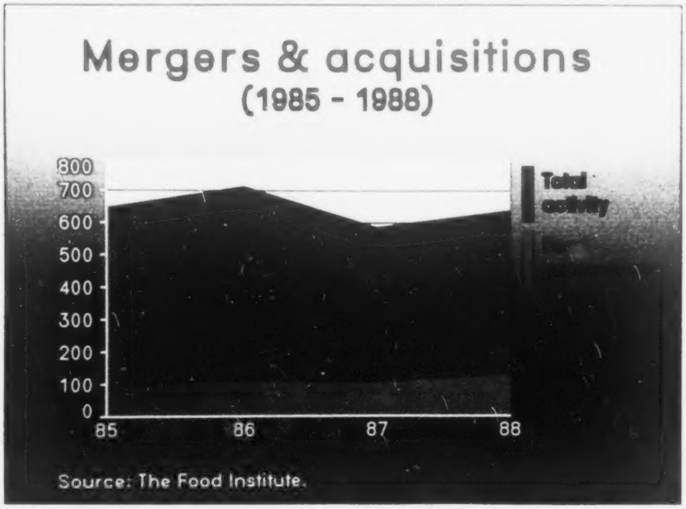
A storm is rising in the supermarket industry which will have direct effect on today's food manufacturers. Just as the food and beverage industry has consolidated itself for strength and marketing clout, so, too, has the supermarket industry. Today's grocery chains are using that clout to decide what will and will not appear on shelves and in freezer cases, and even charging, and getting, slotting fees, or fees paid by the manufacturer to the grocery store to have its product placed in the store.

Producer price index for finished consumer foods (1982 = 100)

1984	105.4
1985	104.6
1986	107.3
1987	109.5
1988	112.6*

*Preliminary figure

Source: The Food Institute



Mergers & acquisitions (1985 - 1988)

Source: The Food Institute.

Along with the slotting fees manufacturers may also find themselves being asked to pay another fee for the supermarket to keep the product on the shelf for a specific period of time, and still another fee for removing products that remain unsold. Grocery chains are also requesting additional promotional support for in-store promotion of specific items, coop advertising monies, and more couponing by manufacturers.

All of this, of course, adds to the cost of doing business. It is a cost borne more easily by large companies with established brands than the smaller companies seeking to get their new products on the shelf. No longer are grocery retailers willing to take a chance with an untried product without sharing the risk. The profit margin in the retail grocery store is a slim one and special fees offer the retailer some form of protection from a significant loss if a new product fails in the marketplace.

"Slotting fees," says Richard Lawrence, president of Marketing Intelligence Service (MIS), Naples, NY, "are the distributors' answer to what is a very real problem. Clearly with 6,000 new products, 13,500 SKUs each year, there isn't room on the shelves for all of these things. The store is not elastic and grocers have to find some way of managing that inventory and minimizing what the distributors see as the high risk of new products." After all, says Lawrence, "they don't want a loser on their shelf when they could have a winner."

It used to be the manufacturers "called the shots." Today, the grocery chains are asking, and receiving, fees to help them reduce their risk. "Slotting fees will be around as long as there isn't a better way for manufacturers and distributors to work together," says Lawrence. "If manufacturers come up with products that are demonstrably going to help the distributor improve his business, then perhaps slotting fees will go away."

Pricing problems

Another move afoot by some grocery chains is to institute a policy of country-wide pricing. If a chain can charge a uniform price in all of its stores for the same product, the retailers reason, they can make maximum use of their promotional dollars. Manufacturers have traditionally charged different prices in different regions for the same products, a practice which, the manufacturers argue, is vital to the overall effectiveness of their marketing strategy.

This is an argument that is just starting, but will continue to be heard in the industry. Retail grocers are becoming increasingly militant in their efforts to have manufacturers share their risk in stocking the thousands of new products that fight for shelf space each year. Retail grocers used to endure this risk themselves...but they're not willing to do it any more.

All of these fees effect the profitability of a product line. How the food and beverage industry responds remains to be seem. There is clout on both sides. It will be interesting to see who throws down the next gauntlet, and what the reaction will be.

Are we becoming boring?

Uniform pricing, slotting fees, product removal fees—all are a result of the fact that there are just too many products to fit in today's supermarkets. In 1988, according to MIS figures, 3,443 new products were introduced, down from 3,582 in 1987. These figures are not the surprising ones. The figure that amazes the most is that 71 percent of the new products introduced, according to MIS, are line extensions. Another 2.6 percent are brand extensions. Only slightly over one-quarter of new products introduced, or 26.3 percent were actually new brands.

Why so few new brands? "Because product line extensions mean a lesser risk to the manufacturer," says Lawrence, MIS president. "It is less risky because they are trading on an established name. If you have an established name with considerable consumer equity, that provides an established platform from which you can launch new products."

In light of the size of the financial transactions that have taken place within the industry the last several years, and looking ahead to an uncertain economic future, it is understandable that manufacturers are going to take the course that offers the least amount of risk. But what will the long-term effects of this be? How many extensions can you come up with before you dilute the sellability of the product? And how long will consumers buy the same "old" product with a "new" taste?

This, to a certain extent, opens the door for smaller companies who have traditionally tended to be more innovative. But the smaller companies are having trouble getting onto grocery store shelves.

Compounding this problem is the fact that people are eating out more. "The distributors," says Lawrence, "are very aware of people eating out more. We need new products which help them compete with food away from home."

The challenge

This, then, becomes a continuing challenge to the food and beverage industry: to develop new products that will pull the consumers back into the grocery stores and take back a portion of what is spent on food-away-from-home. At the same time, grocery stores must be prepared to handle the items. Says Lawrence: "New departments for fast food items, all of them hand-held, microwaveable products, snacks—products aimed at that market." It is both a manufacturing and a retailing challenge.

What follows is a segment-by-segment analysis of the food industry encompassing both past performance and looking at what lies ahead.

Read on

The challenge facing the food industry will be to keep its position of strength in a difficult economic year, and into 1990, when a whole new set of economic concerns are forecast.

Food expenditures compared against disposable income (billions of dollars)

Year	Disposable Personal Income	Food Expenditures	Percent
1966	$ 525.9	109.0	20.7
1976	1252.6	236.2	18.8
1982	2261.4	398.8	17.6
1988*	3473.0	551.9	15.8

*Preliminary

Source: Bureau of Economic Analysis, U.S. Department of Commerce.

Wholesale grocers' sales (in billions)

1985	$216.1
1986	221.9
1987	222.4
1988	240.6

Source: Census Bureau

Farm price index (1977 = 100)

1984	142.0
1985	128.0
1986	123.0
1987	127.0
1988	138.0

Source: Dept. of Agriculture

STATE OF THE FOOD INDUSTRY

SNACK FOODS

According to Al Rickard, director of communications for the Snack Food Association, Alexandria, VA, salted snack and nut retail sales jumped 4 percent in 1988, while value of snacks was up 2 percent last year. The association predicts the total snack market to be worth $8 billion.

Business Trend Analysts (BTA), Commack, NY, says that the salted snack market is expected to reach $5.7 billion next year, up from $4 billion in 1984. Much of this growth is attributed to the success of microwave popcorn. Five years ago, unpopped popcorn accounted for about 3 percent of the market, but now represents about 7.6 percent of the market. Chips, especially tortilla, have also grown, mostly due to the popularity of Mexican food. Chips are responsible for 90 percent of the total market.

Establishing regional success means big profits for snack food producers. Most chip manufacturers are small or medium size and do a great deal of regional business, but regional competition among the big guns is heating up. Borden increased its market share by purchasing successful regional firms. While increasing in size, Borden is still far behind the industry giant Frito-Lay, who has about 50 percent of the chip business. Frito-Lay is also looking to increase its regional business and is aiming to take on Procter & Gamble (P&G), who is gaining share of market with the *Pringles* line. According to BTA, Frito-Lay plans to roll-out its own canister-packed varieties of *Doritos*, corn chips, *Lays*, *Ruffles*, and *Chee-tos*. Products packed in canisters have a much longer shelf life and fewer broken chips. Groff's Snack Foods is packaging its products under a nitrogen atmosphere. Because there is less oxygen in the package to react with the peanut oil, the chips stay fresh longer. The company believes this is doubling the shelf life of its product.

SNACK FOOD SALES
(In millions of dollars)

	1978	1983	1988	1998*
Nuts	$ 1,151	$ 1,499	$ 1,720	$ 2,860
Unpopped popcorn	51	108	406	630
Chips	2,038	3,536	5,037	8,395

*Projection.

Source: U.S. Department of Commerce; Business Trend Analyst, Commack, NY.

P&G is looking forward to producing additional low-fat products if it gains FDA approval of the fat substitute, olestra (see *FE*, June 1987, p. 11). Olestra, a synthetic fat, is not absorbed by the body and is said to have no calories or cholesterol. If olestra is approved, P&G will probably produce a corn chip made with the fat substitute under the Pringles name, says BTA.

According to Marketing Intelligence, Lance Inc., Charlotte, NC, announced that it will reformulate most of its snack line reducing the cholesterol and saturated fat contents in an attempt to to lure consumers who want healthier snacks. Lance says it has reformulated the snacks without ruining the taste by substituting low saturated fat oils like rapeseed (canola) and soybean for high saturated fat oils like coconut and animal oils. These formulation changes will cost more, but the company does not plan to pass the increased price to the consumer.

Sun Snack Foods *Sun Potato Chips* is another one of the first chip products to jump on the canola oil bandwagon. The company claims that these chips, made with 100 percent canola oil as a cooking agent, have 50 percent less saturated fat than regular potato chips.

Corn chips and related products are growing rapidly. During the coming decade these products will probably grow at the rate of 3.3 percent annually, while regular chips are expected to grow 2.6 percent annually.

Popcorn sales have been booming according to BTA—to the tune of 30 percent growth per year since 1984. This rapid growth is driven by the increased use of microwave ovens and the public's desire for a healthy snack. BTA research says that close to 80 percent of U.S. households now have a microwave oven. Microwave popcorn competition is intense and has pushed successful companies to extend their product lines by introducing new flavors. Sour cream, caramel, nacho, and cheddar cheese flavors are among the many choices consumers can make.

At Snaxpo, the annual Snack Food Association meeting held last February in New Orleans, many of the spice and flavor supplier companies exhibited ethnic flavors on potato chips and popcorn. At last year's Snaxpo Cajun and Caribbean were hot items. This year these spices and flavorings were highlighted again, but Italian seasoning was more of a favorite. Some of the Italian-flavored snacks available for tasting were White Cheddar Italian, Alfredo, and Rizotto snack seasoning, a blend of romano and parmesan seasoning with tomato and spice added.

Keeping in line with the ethnic food trend, Keebler last year introduced *Suncheros Tortilla Chips* to challenge the leading brand, *Doritos* from Frito-Lay. Suncheros claim to be the "lightest, crispiest tortilla chips under the sun."

Manufacturers' sales of nuts grew 4 percent in 1988 to $1,720 million, according to BTA. Sales of honey-roasted nuts, the star of the mid-eighties, are now leveling off and have stabilized at close to 20 percent market share of the snack meat nut category. Anheuser-Busch's Eagle Snacks hoped to extend its market share by introducing Maple Roast and Cinnamon Roast flavors for the holiday season last December. These and other gourmet flavors are also making their way into the nut market. Some of the flavors on the market now include Amaretto almonds, mesquite smoked almonds and pecans, cheese, and sour cream and onion.

STATE OF THE FOOD INDUSTRY

DAIRY PRODUCTS

The value of dairy shipments increased an average of 2.1 percent in 1988. The range went from a 5.5 percent increase for condensed and evaporated milk to a decline of 11.5 percent for butter, according to the *1989 U.S. Industrial Outlook*. In general concern about nutrition has resulted in increased consumption of lowfat dairy products and decreased consumption of dairy products higher in fats.

A turnaround in consumption of dairy products occurred during the 1980s. During the late '60s through the mid-'70s, annual 1.5 percent declines were seen in dairy product consumption. But since 1983 consumption of dairy products has risen an average of 2 percent per year. A number of factors have contributed to this turnaround: Retail prices for dairy products have risen less than for most other foods during the '80s; dairy products have been heavily promoted; and higher consumer incomes along with health and nutrition concerns have occurred.

- *Fluid milk:* After a long decline fluid milk consumption is rising modestly. Per capita consumption of fluid milk and cream declined an average of one percent per year from 292.2 pounds in 1965 to 241.9 pounds in 1982, then saw a gain of 3.5 pounds between 1982 and 1986, reports agricultural economists Richard Haidacher and James Blaylock in *National Food Review*, Oct.-Dec. 1988.

Fluid sales of whole milk went from 52.7 percent of the total sales of all milk and cream products (including liquid yogurt and eggnog) to 46.4 percent in 1987, reports the U.S. Department of Agriculture. (Figures for 1988 are not yet available.) At the same time, sales of lowfat and skim fluid milk products rose from 43.1 percent of the total fluid milk product sales in 1984 to 48.7 percent in 1987.

- *Cheese:* Much of the recent increase in total dairy product consumption is due to cheese, reports Haidacher and Blaylock. They point out that per capita consumption, including donations, has grown over 4 percent per year, more than doubling since 1966. Italian-style cheese sales are growing at an especially fast pace. For the three-year period from 1985 to 1987 production of all Italian-style cheeses rose almost ten percent, with mozzarella production rising over 11 percent, reports New York-based Find/SVP in its report, "The Cheese Market." Cheddar cheese remains the most popular cheese in the U.S., though. Cheddar varieties and substitutes made up 46 percent of the value of cheese sold in food stores in 1987.

Dairy products (in millions of dollars)

Value of shipments	**1987[1]**	**1988[1]**	**1989[2]**
Creamy butter	1,636	1,379	1,320
Cheese	11,640	11,945	12,573
Condensed & evap. milk	5,675	5,979	6,313
Ice cream	3,969	3,898	4,055
Fluid milk	16,544	16,662	16,783

[1] Estimated.
[2] Forecast.

Source: U.S. Industrial Outlook 1989 – Food, Beverages, and Tobacco

The future of the cheese market is expected to remain strong. Find/SVP forecasts that dollar shipments of cheese should continue to rise through 1992 when the market is expected to reach nearly $14.8 billion.

- *Yogurt:* Per capita consumption of yogurt in the U.S. has been steadily rising since 1960. According to Find/SVP's report, "The Yogurt Market," between 1975 and 1988 per capita consumption of yogurt rose more than 119 percent, reaching an estimated 4.63 pounds in 1988.

Projected retail sales of yogurt products (in millions of dollars)

	1989	**1993**
Cup yogurt products	$ 1,250	$ 1,650
Supermarket sales of frozen yogurt	100	850
Liquid yogurt products	16	55

Source: FIND/SVP's The Yogurt Market

The six leading cup yogurt producers controlled approximately 74 percent of the market in 1988, according to Find/SVP. Nonfat yogurt products have been especially successful, capturing an estimated 11 percent of the market. The use of aspartame as a sweetener for yogurt products was approved by the U.S. Food and Drug Administration during 1988. This led to a number of new introductions.

- *Ice cream and other frozen desserts:* Although ice cream consumption declined between 1987 and 1988, a come back is expected this year according to the *1989 U.S. Industrial Outlook*. This may be due in part the the blizzard of new frozen novelties which were introduced in 1988 (see *FE*, April '89, p.107). But competition in this area is resulting in declining profits as competition pushes prices down.

- *Future:* According to the *1989 U.S. Industrial Outlook*, total constant-dollar shipments will grow 1.3 percent between 1989 and 1993. This growth will be led by sales of frozen novelties and premium ice cream, cheese will follow, and condensed and evaporated milk will hold third place. Fluid milk and butter will lag behind.

"Within the dairy industry, cheese, yogurt, and ice cream and frozen desserts have outpaced overall sales and growth of the dairy industry and they will remain the growth segments through the 1990s," predicts Find/SVP.

STATE OF THE FOOD INDUSTRY

BAKERY PRODUCTS

Oat-bran mania has taken hold of the world of bakery products as more and more manufacturers discover it is the magic ingredient to spur sales. Since the news broke that oat bran may lower cholesterol levels, bakers are adding the ingredient to breads, muffins and even bagels.

Both processors and farmers were caught by surprise by the surge of shoppers seeking the latest fiber fix. The oat crop prior to '88 was purposely cut back due to low demand and much of it was choked by the drought. As a result, oat bran prices have soared as much as 25 percent with only the largest companies able to afford it. Small processors lack the clout to buy the fiber at reasonable prices and at least one small retailer has been affected by the short supplies. Spartan Stores, Inc. has ordered its 300 chains to stop advertising oat bran products in its bakeries.

Although it is too early to tell, oat bran mania may lessen the brunt of an expected slowdown in bakery goods sales. According to the *U.S. Industrial Outlook:* Per capita consumption of bread in 1989 is expected to decrease by 1.2 percent to 45 pounds; variety bread by 2.3 percent to 16.68 pounds per capita; white bread by 0.6 percent to 26.39 pounds. However, per capita consumption of rolls will rise one percent to 17.39 pounds, reports the *Outlook*.

Multi-grain and hearth-baked breads continue to ride the crest of America's health craze. Anything, ranging from whole-wheat to low-calorie bread, that is perceived as being nutritional is a guaranteed best seller in the bakery section. The success of the vitamin-fortified, high fiber breads has spawned the success of sister products, such as bran muffins and bagels.

Product shipments of bakery and related products (in millions of dollars)

Product	1986	1987	1988	1989[1]
All bread	5,295	5,413	5,698	5,907
White pan	2,950	3,014	3,176	3,306
Varieties	2,095	2,144	2,249	2,320
Unspecified kinds	250	255	274	282
Rolls, stuffing, bread crumbs	2,951	3,006	3,128	3,202
Sweet yeast goods	829	837	874	893
Soft cakes	1,519	1,552	1,625	1,674
Pies	344	348	391	414
Pastries	46	50	55	58
Doughnuts	521	524	548	560
Unspecified	1,162	1,186	1,259	1,307
Total	12,667	12,917	13,580	14,016

[1] Estimated by the International Trade Administration.

Source: U.S. Department of Commerce, Bureau of the Census.

The cookie and cracker business will also maintain positive growth, although it will slow noticeably. During each of the past five years, the cookie and cracker market grew by eight percent to a total of $7.4 billion in 1988, according to Packaged Facts. This rate is expected to calm down to three percent over the next several years, with sales projected to total $8.5 billion by 1992.

Last year, *Food Engineering* reported the influx of in-store bakeries posed a competitive threat to manufacturers' sales. This growth has tapered off with the numbers of in-store bakeries not increasing significantly from their 1987 numbers of 20,203 locations, according to Ed Weller of the International Deli-Bakery Association. However, as new stores open and old ones are remodeled, the in-store bakery will increase in size. Larger bakeries will allow stores to do the same tasks better and on a larger scale.

Some trends piqued by retail bakeries and bakery boutiques (such as David's Cookies or Mrs. Field's Cookies) have propelled manufacturers to launch new products. Remember the soft cookie boom of a few years ago? Bakery boutiques were the first to find out consumers were willing to pay higher prices for cookies with high quality ingredients. In what could be the birth of another trend, David's Cookies of New York has baked up muffins that are low-cholesterol, sugar-free, and oil free. At the same time, in-store bakeries have discovered a resurgence in the demand for decorated cakes. The category was virtually ignored by consumers for the last seven years, according to Weller.

The past year will be best be remembered for the flap over tropical oils that persuaded manufacturers, such as Keebler Co., Sunshine Biscuits, Inc., and Pepperidge Farm, Inc., to remove them from their products.

Although imported cookies have become popular, Danish companies have discovered that U.S. consumers do not differentiate among Danish brands. As a result, some of the Danish firms have formed joint advertising ventures, according to Business Trend Analysts, Inc., the Long Island-based market research firm. While adults enjoy European cookies, General Biscuits, Dairy State Foods and Sunshine Biscuits have capitalized on the popularity of dinosaurs with children by releasing dinosaur-shaped cookies.

Bite-sized cookies and crackers have also taken bigger bites of the market. RJR Nabisco has shrunk the nation's most popular cracker into *Ritz Bits* and has released *Quackers*, duck-shaped crackers, to battle Pepperidge Farm's *Goldfish*. Keebler also jumped on the bite-sized wagon with its *Town House Wheat* and *Classic Juniors*.

The $75 million rice cake industry has repositioned itself from health foods to snack foods, reports Business Trend Analysts, adding sales have risen 19 percent from 1987.

STATE OF THE FOOD INDUSTRY

SHELF-STABLE FOODS

Production value of canned fruits, vegetables, and prepared foods grew 8.3 percent to $26.3 billion in 1988, but constant-dollar growth was only 2.5 percent as the popularity of canned fruits and vegetables continues to slide in favor of fresh and frozen, according to the Department of Commerce. The USDA last November projected 1988 per-capita consumption of major canned vegetables at 85 lbs., down from 87.1 in '87, 90.6 in 1980 and 91.4 in 1970. The National Food Processors Association (NFPA) reported 1987-88 canned fruit/vegetable shipments up marginally from the '86-87 season, with fruit shipments up 4 percent and vegetable shipments up 1 percent. The only canned-fruit item to decline in shipments was Freestone peaches (down 2 percent). Vegetable performance was mixed, however, NFPA reported: Beets, carrots, corn, and green beans were up, while sweet potatoes, asparagus, tomatoes, lima beans, wax beans, and green peas were down. According to a 1988 Business Trend Analysts (BTA), Commack, NY, report, canned vegetables accounted for 34 percent of processed-vegetable sales in 1987, down from 45 percent a decade earlier; canned fruits, while still dominating the processed-fruit market, fell to 57 percent from 64 percent of sales over the same period. Real growth occurred only in the baby food, ethnic food, sauces salad dressings, aseptic foods, and dry soup segments, said Commerce. Salad-dressing shipments gained 2-3 percent along with the growing popularity of salad bars in restaurants and supermarkets. Last year, in fact, 45 percent of supermarkets offered salad bars – up 10 percent from '87. BTA reported processed vegetable-specialties volume at just under $5 billion in '87 and averaging 6 percent annual growth over the past decade, paced by ketchup and other tomato sauces with annual gains averaging 7.6 percent over the same period. Baby-food volume grew 5 percent in spite of negative publicity from the adulterated apple-juice incident. Dry soups now command nearly 30 percent of the soup market, twice the share of a decade earlier. Prepared soups grew overall in '88 to meet consumer demand for microwaveable convenience, says Commerce. Boxed aseptic juices helped reverse consumption decline of canned juices plaguing canners since the '70s, Per-capita consumption of canned juices grew from 7 gallons in '85 to an estimated 8 gallons in '88.

Retail sales of shelf-stable foods in retortable, microwaveable, plastic packaging reached $90 million in 1988, FIND/SVP, New York, NY, reported. A December, 1987 study by BTA reports that 32.9 percent of households owning microwave ovens have purchased microwaveable, shelf-stable dinners and vegetables. FIND/SVP categorizes these products into three segments: tubs, trays, and pouches. Single-serving tub products such as Dial's *Lunch Bucket* entrees, American Home Products' *Chef Boyardee* pasta entrees, Campbell's *Chunky* soups, and Hormel's *Dinty Moore* and *Hormel* stews, hashes, and casseroles accounted for $75 million. Since consumers see these products as logical extensions of traditional canned foods, tub products could capture 50 percent of the prepared canned-foods market and $3.6 billion in sales by 1994, says FIND/SVP. Shelf-stable tray products included Hormel's *Top Shelf* line, and RJR Nabisco's Del Monte *Vegetable Classics*. Products such as these will replace 10 percent of the frozen prepared-foods market within eight years, FIND/SVP predicts. Sales of pouched products such as Magic Pantry's *Kretchmar* line and Sandoz Nutrition's *Healthy Recipe* entrees reached about $5 million in '88, said FIND/SVP.

Commerce projects 1989 growth of canned goods at 1.2 percent and less than 1 percent through 1993 – nearly all from sauces, dressings, ethnic foods, and aseptic juices.

Trends and forecasts: canned foods[1]
(in millions of dollars except as noted)

						annual percent change		
Industry data:	**1985**	**1986**	**1987[2]**	**1988[3]**	**1989[4]**	**1986-87**	**1987-88**	**1988-89**
Value of shipments	22,712	23,296	24,318	26,338	–	4.4	8.3	–
Value of shipments (1982 $)	20,851	21,266	21,596	22,134	22,400	1.6	2.5	1.2
Total employment (000)	128	127	126	128	128	-0.8	1.6	0.0
Trade data:								
Value of imports	2,062	1,831	1,842	2,038	–	0.6	10.6	–
Value of exports	533	593	664	821	–	12.0	23.6	–

[1] SIC 2032, 2033, 2034, 2035.
[2] Estimated except for exports and imports.
[3] Estimated.
[4] Forecast.

Source: U.S. Department of Commmerce

STATE OF THE FOOD INDUSTRY

BREAKFAST FOODS

America's appetite for cereal has registered healthy sales for the breakfast cereal industry. Sales for cold ready-to-eat cereal have jumped from $5.4 billion to more than $6 billion in 1988, according to SAMI Burke, a service of Arbitron. SAMI also reports hot cereal sales have bubbled from $541 billion to more than $676 billion in 1988.

Per capita consumption of all breakfast cereal gained 1.1 percent in 1988, according to the *U.S. Industrial Outlook*. Bran, multi-grain and high-fiber cereals lead the charge upwards in per capita consumption with an increase of 1.9 percent, the *Outlook* reported. Cold cereal per capita consumption wasn't far behind hot, according to the *Outlook*, at 1.4 percent.

Since the announcement by Northwestern University Medical School, who conducted studies for the Quaker Oats Company, that oat bran is linked to reducing cholesterol, the excitement over oat bran has infiltrated the breakfast cereal aisle. Within the last year, many new cereal introductions involved oat bran in one form or another.

- The Quaker Oats Company, Chicago has launched a cold cereal version of its popular oatmeal: *Quaker Oatmeal Crunch Cereal*.
- Ralston Purina, St. Louis, MO released high fiber *Bran News Cereal*.
- Kellogg's, Battle Creek, MI extended its *Common Sense* line of oat bran cereal with the debut of *Common Sense Oat Bran Frozen Waffles*.
- Ralston Purina contracted with Dunkin' Donuts, Placitas, NM to release *Dunkin' Donuts Cereal* which contains four grain cereal.

Both processors and farmers were caught by surprise by the surge of shoppers seeking the latest fiber fix. Before 1988, demand for oat bran was so low, farmers cut their acreage for oats to levels grown during the Civil War. Lower acreage in combination with the drought and a crop failure put a tremendous dent in oat bran stores. In addition, paperboard costs rose 4.3 percent according to the *Outlook*, igniting packaging costs.

Higher producer costs propelled producers to increase the prices of cold cereal by 7.2 percent and hot cereal by 5.6 percent. These increases were passed on to the consumer with an average six percent raise in retail prices for both cold and hot cereals according to the *Outlook*.

What could be next after oat bran mania? Studies from Georgetown University have reported serum cholesterol dropping by 20 percent after individuals ingested raw corn bran. Corn bran is lower in calories and is much more plentiful than oat bran, which may make it the next cholesterol elixir.

Moving from cereal to other breakfast foods, the increased concern for cholesterol has fanned the introduction of many egg substitutes that have low or no cholesterol. *EggZact 100 - Pure & Natural Egg White Solids* is cholesterol free since it contains no egg yolk and can be mixed with water to replace whole eggs.

[illegible] Eggs Delite from Dunkel Farms, Oxford, NY, offer eggs that have 40 percent less cholesterol. An interesting twist to the low salt dilemma faced by breakfast eaters who love to season their eggs has been tackled by a West German veterinarian. Dr. George Lauermann fed an herb mix of rosemary, basil, sage and thyme to chickens to yield spiced eggs.

As a final salute to the often conflicting trends in America's eating habits, Marketing Intelligence has reported that a nutritional campaign that was launched a few years ago to encourage breakfast consumption has brought 29 percent more children to the breakfast table than five years ago. However, the little breakfast munchers are eating 34 percent more sugared cereal than children ate five years ago.

[illegible]

Category	1986	1987	1988	1989[1]
Ready-to-eat	11.36	11.64	11.81	11.94
Corn	3.47	3.54	3.59	3.63
Wheat	3.52	3.61	3.65	3.68
Rice	1.34	1.36	1.38	1.39
All other except baby cereal	3.03	3.13	3.19	3.67
Hot cereal	3.52	3.60	3.65	3.67
Total[2]	**14.81**	**15.17**	**15.38**	**15.52**

[1] Estimated by the International Trade Administration (ITA)

[2] Totals based on production and exports but not imports

Source: U.S. Department of Commerce, Bureau of the Census and the ITA

[illegible]

Industry	1986	1987	1988	1989[1]
Ready-to-serve	4,162	4,524	4,963	5,491
Hot cereals	495	536	579	631
Unspecified items	8.2	9.1	9.1	9.4
Total	4,665	5,069	5,551	6,131

[1] Estimated by International Trade Administration (ITA)

Source: U.S. Department of Commerce, Bureau of the Census and ITA

STATE OF THE FOOD INDUSTRY

MEAT & POULTRY

Per-capita consumption of poultry surpassed that of beef for the second consecutive year, USDA reported. Americans consumed 7.6 lbs. more poultry (chicken plus turkey) than beef in 1988, and USDA predicts that the gap will nearly double to 14.5 lbs. this year, reflecting consumer health and nutrition concerns.

According to the Commerce Department, the value of red-meat shipments rose 9.1 percent last year to $46.8 billion in current dollars, but only 0.8 percent in constant dollars as red-meat production edged up only 0.4 percent to 38.6 billion lbs. Beef production was static in 1988 at 23.4 billion lbs., USDA reports, and will slide 3 percent this year to 22.75 billion lbs., although beef producers are starting to expand their herds after five years of slow decline. Pork production rose 9 percent to 15.6 billion lbs. in '88 but will slip 1 percent this year to 15.45 billion lbs. Higher feed costs due to last summer's drought plus dry conditions through mid-winter in many areas will weigh heavily on beef pork breeding and culling decisions. Poultry shipments increased 8.9 percent in current dollars (2.6 percent in constant dollars) to $12.6 billion last year, says Commerce. According to USDA, broiler production was up 3 percent to 16 billion lbs. and turkey production up 5 percent to 3.9 billion lbs. Even with higher feed costs, broiler production will rise 5 percent this year and turkey production 4 percent, USDA predicts. Overall, record meat supplies will tend to hold livestock prices steady in 1989 but rising costs associated with processing and marketing beef, pork and poultry in new value-added forms will push retail meat prices up, says USDA.

Processed red-meat shipments totaled $16.2 billion in 1988, Commerce reported. According to an A.C. Nielsen report to the joint AMI FMI meat-marketing conference March 20 in Los Angeles, retail sales of five processed meat segments grew 3 percent, from 2.55 billion lbs. in '87 to 2.62 billion lbs in '88. Breakdown: sliced luncheon meats up 4 percent to $1.95 billion (with 2 percent of the gain attributable to increased volume, 2 percent to higher prices); hot dogs and franks up 2 percent in dollar volume to $1.18 billion, up 3 percent in physical volume to 738 million lbs.; prepackaged bacon down from $1.2 billion to $1.02 billion but weight up 5 percent to 607 million lbs. (with low-salt bacon gaining 30 percent to 33 million lbs., or 5.4 percent of bacon sales); smoked sausage down 1 percent in dollar sales to $702 million as poundage plateaued at 296 million lbs.; breakfast sausage up 3 percent in weight (to 303 million lbs.) while falling 3 percent in dollar sales (to $637 million.)

Per-capita consumption of meat and poultry (in pounds)

Year	Beef	Pork	Chicken	Turkey	Veal	Lamb	Total
1985	78.8	62.0	57.6	12.1	1.8	1.4	213.7
1986	78.4	58.6	58.8	13.3	1.9	1.4	212.4
1987	73.4	59.1	62.8	15.1	1.5	1.3	213.2
1988[1]	72.7	63.1	64.1	16.2	1.4	1.4	218.9
1989[2]	69.9	62.7	67.5	16.9	1.4	1.4	219.8

[1] Forecast.

[2] Estimated.

Source: USDA (February 1989)

Several packers (Hormel, John Morrell, Thorn Apple Valley) introduced branded, vacuum-packed or CAP-packaged boneless fresh pork cuts in '88. Branded fresh-beef cuts combining selective breeding with tight trim to cut calories were introduced by Larsen Beef Co., an Ohio packer, and Hughes Supermarkets in Southern California. *Larsen Beef* cuts are packaged in conventional plastic trays with film overwrap and distributed under refrigeration. The gradual trend toward centralized meat cutting continues. "Currently most of our fresh pork and some of our beef comes to us in retail packages," said Byron Allembaugh, chairman and CEO of Ralph's Grocery Co., at the AMI FMI marketing conference. "Central retail cutting and packaging *does* work today with no advance technology other than sanitation and temperature control. No doubt there are still breakthroughs ahead where controlled environment packages can be developed that will maintain the bloom of the product and be acceptable to the consumer."

Most important retail trend for meat packers and processors to recognize: the blurring of the traditional fresh-meat department into the deli, with the need for more convenient, value-added fresh-meat products in three categories, as defined by Willard Bishop Consulting, Ltd. in a 1988 study for AMI: ready-to-cook, ready-to-heat, and ready-to-eat. Most value-added fresh-meat products are now prepared at store level but "we're not interested in creating meat items if you can provide them to us," said Nancy Lazara of Larry's Markets (Seattle) at the annual AMI meeting last October in Las Vegas. "Most of my experience with meat-processing company salesmen has been negative. They have a hard time accepting that declining fresh-meat sales are moving into the ..prepared-foods arena."

Long-term outlook, says Commerce: animal growth hormones will boost lean-to-fat ratios, reducing beef and pork fat by as much as 50 percent without sacrificing consumer acceptance and saving producers about $2 billion in feed costs. Per-capita consumption of red meat will fall through 1993, but packers will boost profits through product innovations and by closing inefficient plants. As red-meat packers expand via acquisition into the poultry business and vice versa, by 1993 there will be 25 percent more meat-and-poultry plants than meat-only plants and the number of poultry-only plants will decline. Per-capita consumption of poultry will rise as a percentage of meat consumed from 37 percent last year to 42-44 percent by 1993.

STATE OF THE FOOD INDUSTRY

CONFECTIONS

The U.S. candy industry is experiencing healthy growth. The 1988 value of total confectionery industry shipments reached an estimated $9.1 billion, or an increase of 5.1 percent over their 1987 value, according to the *1989 U.S. Industrial Outlook*. And the 1988 value of confectionery products produced by all industries was estimated at $10.3 billion.

Total U.S. consumption of candy for 1988 was estimated at approximately 4.6 billion pounds or 2.2 percent over the 1987 level, according to the Industrial Outlook. This would amount to a per capita consumption of all candy of about 18.5 pounds, with chocolate candy per capita consumption estimated to be 9.9 pounds and nonchocolate 7.8 pounds. A larger increase in U.S. production of candy as compared to consumption is due to a significant increase in the quantity of U.S. candy exports during 1988, while the estimated quantity and value of candy imports declined considerable (see chart).

Varied texture and unusual flavors are two of the main trends in confectioneries, says Joan Steuer, president of Los Angeles-based Chocolate Marketing Inc. (CMI). Chocolate and nut blends are popular now – especially ones including hazel and macadamia nuts.

Peanut butter is another exciting part of the current confection market. For example, Leaf, Inc., Bannockburn, IL, recently introduced *Crunchers* candy – bite size candy combining crunchy peanut butter and milk chocolate.

"People want crunch and dual texture," Steuer told *Food Engineering*. "Bite-size or individual portions are also very popular now. This allows people a form of calorie control, convenience and portability."

Traditional items such as caramels and milk chocolate are regaining popularity, while "white" chocolate remains a fad. Part of the problem with "white" chocolate is there is no standard classification, and this makes it difficult to obtain marketing data, explained Steuer. Without available numbers, most major manufacturers are not venturing into this area.

One of the reasons for the decrease in imports is that American candy is currently very popular – it is perceived as fresher and not significantly different enough from European candies to justify the increased cost, says Steuer. "Super-premium European chocolate is purchased mainly for gifts and, therefore, its image receives more attention," she explained. "With this in mind, European manufacturers are concentrating on presentation – with packaging being very important."

In the hard candy area, lollipops are currently in vogue, says Don Davis of Selma, AL-based American Candy Manufacturing Company. Children want sugary products while teenagers prefer tart flavors, he added. The most popular flavor is peppermint with fruit flavors following.

There has been increased interest in natural flavors for candies recently, points out Sandry B. Lowry, marketing specialist for Rudolf Wild of America, Inc., San Mateo, CA. The popular line of *Jelly Belly* Jelly Beans, from Fairfield, CA-based Herman Goelitz Inc., is made with natural flavors whenever possible. Buttered popcorn, orange sherbet, tutti-fruitti, lemon meringue and totally mint are the most recent additions to the line; while very cherry, green apple, coconut, licorice and cinnamon are the most popular varieties.

A number of companies are offering lines of sugar-free candy. For example, Great Expectations Confections, Inc., Chicago, IL, markets *Katherine's Own Sugar Free Confections*. Sweetened with lycasine (or hydrogenated starch hydrolysate), this line includes toffee, chocolate-coated caramel-nut clusters, pecan brittle, and caramels.

Steuer has reservations about the overall appeal of sugar-free candies, noting a price/value problem. "People aren't willing to give up quality without a reduction in calories, after all candy is for indulgence," she explained.

Steuer predicted that candy which combines sweet and salty tastes will be popular in the future. Sweet and salty snacks are currently popular, and it's only a matter of time before these types of candies are seen, she noted.

Confectionery products
(in millions of dollars)

	1986	1987[1]	1988[2]	1989[3]	percent change 1986-87	1987-88	1988-89
Value of shipments	9,387	9,810	10,309	10,863	4.5	5.1	5.4
Value of shipments (1982$)	7,266	7,517	7,834	8,155	3.5	4.2	4.1
Value of imports	326	315	282	–	-3.4	-10.5	–
Value of exports	237	266	329	–	12.2	23.7	–

[1] Estimated except for imports and exports.
[2] Estimated.
[3] Forecast.

Source: U.S. Industrial Outlook 1989 – Food Beverage, and Tobacco.

STATE OF THE FOOD INDUSTRY

DRESSINGS & SAUCES

In the continuing drama of dressings and sauces, low calorie salad dressings still steal top billing and ethnic sauces are irrepressible co-stars. Retail sales of low and reduced calorie salad dressings shot up by more than 16 percent to total $204 million in 1988, according to SAMI/Burke. The next top rated category was regular calorie salad dressing with sales for pourable dressings increasing by 5.8 percent with $725 million; and spoonable dressing sales rose by 5.2 percent to $412 million in 1988, SAMI reported.

Some of the new low-calorie salad dressings:

- Thomas J. Lipton, Inc., Englewood Cliffs, NJ marketed *Wish Bone Lite Chunky Blue Cheese* and *Lite Classic Dijon Vinaigrette* dressings. Both dressings have less oil.
- Seven Seas, Inc., Glenview, IL, offered *Seven Seas Viva Light Reduced Calorie* dressings. Varieties include: Caesar, Creamy Italian, Herbs & Spices and Red Wine & Vinegar.

The salad dressing market is expected to increase by six to nine percent by 1992, according to SAMI/Burke. Currently, 56 percent of consumers queried by SAMI use a bottle of salad dressing each month; approximately nine percent use four or more bottles per month. Talking about bottles, Kraft promoted its *Kraft Thousand Island Dressing Squeezable* in a 12 ounce plastic squeeze bottle.

Ethnic food sauces, especially Italian sauces, remain as favorites on shoppers' menus. Italian food sauces broke the billion dollar barrier with sales of $105 billion in 1988, up 7.6 percent from 1987. Line extensions seem to make up the bulk of activity within the category. Campbell Soup's *Prego* rolled out *Extra Chunky* in 1988 which followed 1987's *Prego Plus*. Chesebrough-Pond's *Ragu Thick 'N Zesty* replaced *Thick 'N Hearty*. Planned obsolescence is built into much of the new Italian sauces introduced; a new rollout can expect an average lifespan of one year. Together *Ragu* and *Prego* account for approximately three-quarters of the market. Borden's Prince Company holds about ten percent of the market. In 1988 Borden's *Classico* completed its national roll-out while simultaneously becoming the nation's number one premium sauce.

Retail sales of sauces, dressings, and condiments (in millions of dollars)

	1987	1988	% change
Mayonnaise	630	660	+4.5
Spoonable dressings	390	412	+5.2
Pourable dressings	683	725	+5.8
Low/reduced calorie dressings	170	204	+16.8
Ketchup	500	512	+2.3
Prepared mustard	186	197	+5.5
Meat sauce	219	228	+3.4
Italian food sauce	971	1.005	+7.6
Liquid gravies, sauces	182	192	+5.0
Dry gravies, seasoning, sauces, and mixes	354	360	+1.8
Barbecue sauce	321	329	+2.6

Source: Selling Areas-Marketing/Burke, a Service of Arbitron, New York, NY

Mexican sauces is another category that has shown fiery growth, with salsa leading the charge. The Mexican sauce industry has grown at a rate of 15 percent per year to total approximately $300 million last year. Chapala International reported a 231 percent increase in sales when it switched its salsa packaging to glass jars.

The current trend in health and nutrition spills over to dressings and sauces with increased concern over cholesterol. Best Foods, a subsidiary of CPC International, Englewood, NJ has unveiled a cholesterol-free mayonnaise made without egg yolks.

Prepared mustard showed impressive sales gains in 1988 of $197 million, an increase of 5.5 percent over 1987, according to SAMI/Burke. Consumers seem to have discovered that mustard offers flavor with fewer calories than richer sauces. Dijon mustard makes up approximately 20 percent of the mustard market and has aroused considerable interest in the Northeast.

Consumers continue to show their preference for convenience products and ready-made gravies have cashed in as a result. SAMI/Burke reported that liquid gravies and sauces sales have grown to $192 million in 1988, up 5 percent from 1987. Although dry gravies remain a strong contender with sales of $360 million, this has only been an increase of 2 percent over 1987, according to SAMI/Burke.

Another sauce trend that has grown steadily and promises to continue to sizzle is barbecuing. Sales of barbecue sauce has picked up with 1988 sales totaling $329 million, an increase of 2.6 percent from 1987.

Barbecue sauces have evolved from basic tomato-based sauces to extravagant mixtures of spices and sauces. Golden Whisk California Condiments of San Francisco offers its *Super Sauce* that is described as containing "macho mesquite, garlic and power spices."

As America's palete continues to warm up to spicier sauces, H.J. Heinz has shown its readiness to comply with *Old Fashioned* and *Texas Style Hot* varieties to its barbecue sauce line. Barbecue goes international with the introduction of *Roger Hong's Chinese Barbecue Sauce* and *Szechuan Sauce* by Roger Hong Foods, Forest Grove, OR.

Heeding the continual call for convenience, McCormick's has created *MW Mastery Sauce Blend* that includes a special cooking bag from Ziploc and sauce that can be used to cook chicken.

STATE OF THE FOOD INDUSTRY

BEVERAGES

In 1988, the combined value of all U.S. beverage alcohol producers shipments reached $20.9 billion, an increase of 4.1 percent over 1987, according to the Department of Commerce (DOC). Beer industry shipments reached $13.3 billion, just 3.3 percent over 1987. Wine and brandy shipments grew 12.7 percent to $4.1 billion in 1988.

During the first six months of 1988, says DOC, personal consumption expenditures for all alcoholic beverages rose 2.1 percent over 1987. Dollars spent on drinking in public places rose 2.2 percent, while dollars for in home use rose 2.0 percent. Many analysts conclude that shifts in alcoholic beverage taste preference, in response to health and social concerns, may spell difficult times for the industry.

Upscale wines fared better than the $3 jug varieties in 1988. Shipments of premium ($4-7) and superpremium ($7-14) increased 20 percent since 1984 and are giving wine imports a run for their money. While wine sales are up, this does not mean that consumers are drinking more wine, they are just willing to pay more for better quality. On the other hand the wine cooler market cooled down – to a four percent drop in just the first half of '88.

Spirit consumption is estimated by the Commerce Department and others to dip slightly when all the 1988 figures are in. According to *Beverage Industry*, per capita consumption of spirits dropped to 1.6 gallons in 1988 from 1.7 in 1987.

In 1988, the value of bottled and canned soft drinks industry shipments rose 6.9 percent to about $23.5 billion. During the heat wave of 1988, Americans quaffed down 45 gallons per person, says DOC–or close to 1.3 12-oz. bottles a day per person Coke and Pespi continue to lead the pack and battle each other for market share, with the war heating up especially between the diet and caffeine-free versions of each brand. According to the *U.S. Industrial Outlook*, the diet cola wars are heating up because many analysts believe the demand for diet soda is growing four to five times faster than traditional sugared sodas.

Top ten soft drink brands (1988 share of market)

Brand	% of market
1. Classic Coke	20.1
2. Pepsi-Cola	18.6
3. Diet Coke	8.2
4. Diet Pepsi	5.2
5. Dr Pepper	4.4
6. Sprite	3.6
7. Mountain Dew	3.4
8. 7 Up	3.1
9. Caffeine-free Diet Coke	2.0
10. Royal Crown	1.6

Source: John C. Maxwell, Jr., First Wheat Securities, Richmond, VA.

Juice-added soft drink sales appear to be taking a dive according to DOC. Government reports say that sales of the leading line in the juice-added category went down in the first six months of '88 and the category lost market share. But, Business Trend Analysts (BTA), Commack, NY, predicts good things for juice-added soft drinks. The Long-Island-based firm predicts rapid expansion into the next decade, and the company predicts this segment will account for overall 5 percent of the soft drink market. According to BTA estimated figures, the dollar value of the market for juice-based soft drinks was up 28 percent in 1988 and is worth $1,325.9 million.

Beverage industry shipments (in millions of dollars)

	1986	1987[1]	1988[2]	1989[3]
Soft drinks	20,687	21,992	23,500	25,380
Malt beverages	12,678	13,026	13,450	13,962
Wines and brandy	3,163	3,606	4,063	4,660
Distilled liquor	3,504	3,444	3,378	3,322

*Value of all products and services sold

[1] Estimated except for exports and imports

[2] Estimated.

[3] Forecast.

Source: U.S. Department of Commerce. Estimates and forecasts by International Trade Administration.

The fruit beverage industry remains one of the more exciting performers within the overall beverage industry according to BTA. Increasing consumer awareness of health and nutrition has caused per capita consumption of fruit juices to jump up to 8.1 gallons per year.

The hot beverage market peaked in 1976, according to BTA and has been on a downslide ever since. In response to declining coffee sales, hot cocoa and tea are experiencing increased market share. The sweetened cocoa market increased 8 to 11 percent each year in the mid to late '80s, but is projected to level off to about 4 percent per year growth by 1996, according to BTA.

According to the Food Institute, other frozen juices are squeezing out orange juice in the freezer case. The proliferation of what is called "miscellaneous juices," including blends and mixes is leaving less and less room for the traditional frozen concentrated orange juice. According to SAMI/Burke, sales of miscellaneous juices jumped 25.8 percent from $141 million in '87 to $179 million in '88.

STATE OF THE FOOD INDUSTRY

FROZEN FOODS

Frozen dinner and entree sales nearly doubled in just six years – from a wholesale value of $1.8 billion in 1982 to $3.5 billion in 1988 – and will double again to reach $7.5 billion by 1997, according to a May '88 study by Business Trend Analysts (BTA), Commack, NY.

1988 retail sales of 15 frozen meat and vegetable dinner/entree categories selected by *Food Engineering* from a study by Arbitron/SAMI total $4.75 billion, up 4.4 percent from $4.55 billion in 1987 (see table). The Arbitron/SAMI study shows frozen meat and fish *per se* declining in favor of frozen prepared poultry, meat, and fish dinners and entrees (and probably fresh deli dinners and entrees as well), confirming the convenience trend. The dominance of poultry entrees and the growing popularity of seafood entrees confirms the health/nutrition trend seen in fresh meats. Frozen ethnic dinners/entrees were estimated by Business Trend Analysts to represent 17 percent of the overall ethnic food market last year. Italian (excluding pizza) dominates the category with Mexican growing rapidly. BTA and Arbitron/SAMI disagree on Oriental dinners/entrees, however, BTA shows this segment growing, Arbitron/SAMI shows it declining.

More than a third of U.S. households purchased low-calorie frozen entrees in 1988, up from 25 percent in 1986, the Department of Commerce reports. Low-calorie frozen dinners/entrees – such as *Weight Watchers* (Heinz), *Lean Cuisine* (Nestle's Stouffer's), *Le Menu Lightstyle* (Campbell's), *Armour Dinner Classics Lite* (ConAgra) and *Budget Gourmet Slim Selects* (Kraft) – are among the fastest-growing frozen segments with sales growth averaging 24 percent per year over the past five years, says BTA. It projects low-cal dinners and entrees to continue growing at an average rate of 13.6 percent per year.

"Manufacturers hoping to duplicate the success of *Lean Cuisine* or *Le Menu* launched a deluge of new products," BTA reported. This accelerated the battle for scarce freezer space and partly prompted the introduction of retortable, microwaveable, shelf-stable entrees. The majority of frozen dinner and entree offerings are, in fact, dual ovenable, BTA points out. As reported by *Food Engineering* (April '89), 158 new microwaveable frozen meat, poultry, and seafood entrees and meals were introduced in 1988. Manufacturers have opted to either 1.) reformulate products or redesign packaging for microwaveability, or 2.) simply add microwave cooking instructions to the existing package. "The latter course...has yielded the least positive results in terms of an item's taste and texture...," BTA concluded.

ConAgra introduced a competitive difference with a time/temperature-sensitive "MicroReady Indicator" (which changes color to indicate optimum cook under microwave) to its *Armour Dinner Classics* line. The trend toward microwaveable, single-serving vegetable entrees with an international flavor was exemplified by General Foods' 16-item line of *Birds Eye For One* frozen vegetable and pasta entrees. Packers introduced frozen pizzas to cut a bigger slice of the booming $22-billion pizza market, where pizzerias and home deliveries account for 90 percent of sales.

The DOC estimated 1988 value of frozen-food shipments at $14.6 billion, up 8.3 percent in current dollars but only 3.8 percent in constant dollars from a year earlier. Outlook: Frozen-food shipments will grow by 1.5 percent this year, mainly from low-cal entrees and baked goods. The frozen breakfast category will show "tremendous growth" between 1989 and 1993 to compete with the breakfast entrees of fast-food restaurants, says Commerce. Refrigerated fresh entrees will steal some market share from frozen entrees, and although the long-predicted shakeout of frozen dinners has begun, frozen entrees will continue to be popular because of microwaveable convenience.

Sales of selected frozen foods
(in millions of dollars)

Item	1987	1988	% change
Meat	$ 157.9	$ 149.4	-5.4
Fish	975.8	956.9	-1.9
Entrees:			
Poultry	1,058.0	1,100.0	+4.0
Meat	407.6	420.9	+3.3
Fish	128.7	132.9	+3.3
Italian	772.3	834.8	+8.1
Mexican	263.0	278.7	+6.0
Oriental	223.0	216.2	-3.0
Dinners:			
Basic	1,088.0	1,108.8	+1.9
Mexican	97.0	103.8	+7.0
Oriental	47.0	35.6	-24.3
Vegetables:			
Veg. w/butter sauce	76.0	83.0	+9.2
Veg. w/cheese sauce	94.0	105.2	+12.0
Veg. w/cream sauce	26.1	30.0	+14.8
Veg. w/out sauce	95.0	98.3	+3.5
International style	126.0	148.9	+18.2
American style	49.9	55.7	+11.6

Source: Arbitron/SAMI.

STATE OF THE FOOD INDUSTRY

SEAFOOD

Per capita seafood consumption in the U.S. fell in 1988, after five straight years of increases. The National Oceanic and Atmospheric Administration (NOAA) announced that Americans consumed 15.0 pounds of seafood (edible weight) per capita in 1988, down from a record high of 15.4 pounds in 1987.

The decline was attributed to record breaking seafood exports in 1988, combined with lowered imports – especially frozen blocks of fish steaks and fillets – reducing the overall amount of fish available in the U.S., according to NOAA's National Marine Fisheries Service.

Consumption of fresh and frozen fish fell from a record 10 pounds per person in 1987 to 9.6 pounds last year, while both canned and cured seafood held steady during the same period (see chart). The per capita consumption of shrimp rose to a record 2.4 pounds in 1988, up from 2.3 pounds in 1987, reports NOAA. (Shrimp from aquaculture accounted for 22 percent of the world's supply in 1988, according to *Aquaculture Digest*.)

Reacting to the 1988 per capita seafood consumption figures, Lee J. Weddig, executive VP of the National Fisheries Institute (NFI) stated, "Last year was an unusual one for our industry. Those companies exporting seafood enjoyed a record breaking year with U.S. seafood exports reaching $2.2 billion, an incredible 37 percent increase from 1987."

"While the low value of the dollar helped us become the number one seafood exporter, it also had the converse effect of making it more expensive to meet market demands for some imports," he said. "The continued growth of seafood in both domestic and export markets is dependent on the industry's ability to increase supplies at attractive prices."

The major contributor to the 1988 increase of U.S. exports was a jump of 49 percent in purchases by Japan. In 1988 Japan purchased almost $1.6 billion worth of fishery products, according to NFI. The largest volume and value exports are Pacific salmon and Alaskan crab products.

Sales of seafood products (in millions of dollars)

	1987	1988
Frozen seafood	975.8	956.9
Frozen seafood entrees	128.7	132.9
Canned salmon	240.0	231.3
Canned sardines	103.5	101.4
Canned shrimp	68.5	64.4
Canned tuna	1,416.4	1,558.3
Canned miscellaneous	162.5	168.9

Source: SAMI/Burke, Inc.

Between 1982 and 1987 U.S. per capita consumption of seafood increased 25 percent. Much of this increase can be attributed to the positive publicity generated by the health benefits of eating seafood, pointed out Lee Weddig. "Beginning in late 1987, however, these stories began getting pushed out of the headlines by stories about ocean pollution and sensational news stories regarding perceived problems with overall seafood safety," he added.

It is too early to know the economic impact of the Alaskan oil spill on the seafood industry. But to help eradicate public concern over seafood safety, NFI's Board of Directors, at its annual convention in Las Vegas, NV on April 12th, unanimously voted to immediately seek legislation establishing a seafood inspection program. Specific elements sought in the inspection program are: administration by a single federal agency; surveillance of operations consistent with HACCP principles (not continuous inspections); inspection of imports at the same level as domestic products; and regulation of labeling.

U.S. per capita seafood consumption (lbs.)

	1984	1985	1986	1987	1988
Fresh/frozen	8.5	9.0	9.0	10.0	9.6
Canned	4.9	5.1	5.4	5.1	5.1
Cured	.3	.3	.3	.3	.3
Total	13.7	14.5	14.7	15.4	15.0

Source: National Marine Fisheries Services

"Of all meat protein groups, seafood is the only one which has consistently increased in both price and per capita consumption," stated Weddig in his address at the annual NFI convention. To analyze trends within changes in seafood consumption, NFI commissioned a study from MRCA Information Services to isolate changes for certain populations subcategories. Several of the conclusions reached are:

- Seafood consumption has risen by 25 percent since 1982 mostly due to existing seafood consumers eating more, not because new consumers are beginning to eat seafood.
- At home servings of all seafood increased by 12.2 percent between 1982-82 and 1987-88. Away from home servings over that same period increased by 8.0 percent.
- If population projections are correct and regional trends in seafood consumption continue, 37 percent of the increase in seafood consumption between 1988 and 2010 will occur in the south. The northeast will account for 35 percent; the west, 25 percent; and the midwest, 3 percent.
- Ready-to-eat products which require only heating have grown almost twice as fast as products requiring any other method of preparation.

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COVER STORY

Changing lifestyles and the new technologies of barrier plastics and microwave cooking are sparking a second revolution in convenience foods. The tray and lidstock materials are from the family of polyester resins produced by Eastman Chemical Products, Inc. Kingsport, TN.

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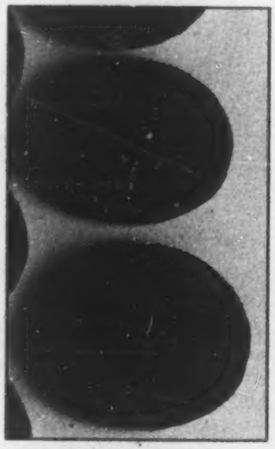

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Since higher levels of automation became popular in food processing, sensors have been thrust to the forefront of the arena.

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READ IT AND WIN AD CONTEST
For readers and advertisers
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How to Cut Food Products

The food processing industry throughout the world requires that food products be uniformly size reduced – sliced, diced, shredded, comminuted, etc. – into an almost endless array of different sizes and shapes.

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CHOICES

Kristen McNutt, Ph.D., J.D.

WILL FOOD LABELING LEGISLATION HELP CONSUMERS?

Understanding our failures before improving the system.

Revision of nutrition labeling regulations promises to be a hot topic with the 101st Congress. New legislation will, no doubt, create significant costs to the food industry which will be passed on to consumers.

Making change may be politically smart for legislators. It could demonstrate industry's responsiveness to consumers. But moving ahead without the proper analysis could be an expensive exercise in futility. Trade-offs between various lobbying groups might result in throwing out some things which are potentially useful. The new rules might be no better, perhaps even worse, than what we now have unless we first figure out why the current labeling system has failed.

The objective of nutrition labeling

The nutrition information panel on food labels is a tool for consumer education. But criticizing the labeling system for not having educated consumers about diet and health is like condemning cigarette package warnings for failing to reduce deaths from lung cancer and heart disease.

With this limitation in mind, the objective of labeling becomes: *to provide information which can be used directly by consumers and by health educators to help consumers select a total diet and choose among product options.*

Reasonable expectations

The narrow focus of "labeling legislation" encompasses only the nutrition information panel. Anyone who expects miracles from simply changing these regulations will be sorely disappointed. A far more comprehensive bill is required should Congress address other tools for helping consumers make food choices. Bringing standardized foods within nutrition labeling requirements, defining terms such as lite or light, quantifying "reduced, low, very low, and x-free" and harmonizing FDA's and USDA's regulations might improve the usefulness of the label, even as it stands today.

Ideally, the nutrition panel will complement the efforts of professional associations, quasi-government agencies such as the National Research Council and health voluntaries; but Congress has no power to direct the messages of these groups. Changing the nutrition information panel will have little or no effect on brand-specific, disease-prevention claims which are commonly referred to as health claims. Nor will such legislation reach what food manufacturers can say about their products to health professionals who then pass the word on to consumers.

Flexibility for 2005

Although piecemeal amendments have been made over the years, the last major nutrition labeling revision occurred 16 years ago. Should the changes made by the 101st Congress last as long, we'll have to live with them until the year 2005.

A long range perspective increases today's legislative challenge. It emphasizes the need for a new labeling system to deal with gaps in our current scientific knowledge, for example the physiological effects of various fatty acids, the factors affecting the bioavailability of minerals and the currently tentative understanding we have of diet and cancer. New regulations should provide ways of handling future topics about which we know as little today as we knew in 1973 about dietary fiber.

Dearth of labeling education

Misplacing the blame for labeling's failures could lead to our repeating mistakes. The flaw could be our not having learned how to use it.

In the early 1970s the National Nutrition Consortium commissioned Ron Deutsch, with input from an extensive group of advisors, to write a mini-manual which explained nutrition labeling to consumers. Concurrently, FDA developed print and audiovisual materials. Professional groups and food companies prepared pamphlets and developed other educational programs. More recently, however, labeling education has been overshadowed by emphasis on diet and chronic disease.

Industry has followed this trend by giving greater attention in consumer education materials to defensive rath-

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Source: Consumer Choices Unlimited, Inc.

er than offensive eating advice. In February, I wrote under a pseudonym to 54 food companies, using the address printed on product labels. And I published an abbreviated version of my findings in the August issue of *Food Engineering*. Let me present the full picture here. Forty had the nutrition information panel and 14 did not. The first letter, to the manufacturers of nutritionally labeled products, read: "The doctor says my blood needs more iron and my husband does not want to eat fat. I like your [product name] but I can't understand the nutrition number on the [location on the container]. Will you please explain to me what they mean." The second letter, to those not nutritionally labeled, asked about the nutrition in their product and why they didn't put information on their labels.

The lack of response from twelve companies may be due to incomplete address information on the product labels but the post office did not return any letters. The first 30 percent of responses, most of which just sent more nutritive value charts which I had already said I didn't understand, arrived within two weeks. The last 30 percent came more than five weeks after I had mailed my request. The content of the responses supports the hypothesis that industry is poorly prepared to explain this part of the label to consumers.

What's worth saving?

Labeling legislation amendments should salvage what is potentially useful. Retaining what consumers now know how to use would be better than asking them to start over completely learning a totally new system.

Calories per serving seems worth keeping. This section might be more helpful if we highlighted the importance of consistent intra-product serving sizes. The U.S. RDA is also a viable concept. Although many health professionals still don't even understand this standard, it does obviate the need for consumers to deal with milligrams, micrograms, and international units. The relative effectiveness of presenting percent U.S. RDA in absolute numbers versus pie or bar charts is a researchable question.

The label has been criticized because it gives *food* information in grams, whereas health educators give *diet* advice in percentages. For example, today's label easily shows consumers that whole milk contains 10 grams of fat and two percent milk only five. But the 10 and the five are not being translated by nutritionists into information that fits their advice to restrict dietary fat to 30 percent of calories.

Some simple arithmetic, using information already on the label, can help. All you need to do is estimate your calorie intake, drop the zero from that number and divide by three. For example, 2,100 calories becomes 210; dividing by three gives 70—you've got the grams of fat which you can eat and stay within the 30 percent recommendation. Now that five gram difference between whole versus skim milk shown on labels is useful information.

The current label can also easily tell consumers the approximate percentage of calories from fat in a product, versus from protein and carbohydrate. Since so many products contain no fat, it makes more sense for quick food evaluations to use a guideline of 50 percent rather than 30. Just add the protein and carbohydrate numbers and divide by two. If that number is larger than the fat number, more than 50 percent of the calories are from protein and carbohydrate. If it's smaller than the fat number, the food is more than 50 percent fat.

Labeling legislation is not enough

Whatever new system lies ahead, neither the simplest graphics nor a multipaneled fold-out label can substitute for consumer education. Congress will have done only half its job by revising labeling regulations unless legislators also vote for consumer education funds for the Extension Service and other government agencies which can explain the system to the public.

Nutrition educators who can assess whether a proposed system lends itself to progressive teaching models have as much, perhaps more, to contribute to the legislative decision we face as do lawyers and biomedical scientists.

Consumers have responsibilities, too. Unless they are willing to have government act as a surrogate parent and tell them which foods are good or bad for them, they must invest some time in understanding the label.

The label cannot do everything. But it can do some things well. Our challenge is to use its strengths and to build in the potential for complementing efforts that are designed for education and other purposes.

Kristen McNutt is President of Consumer Choices Unlimited, Inc. and Editor of Consumer Magazines Digest which summarizes the critical nutrition and food safety articles in more than forty popular magazines. Comments and inquiries about this column should be sent to her at 1742 Asbury Avenue, Evanston, IL 60201.

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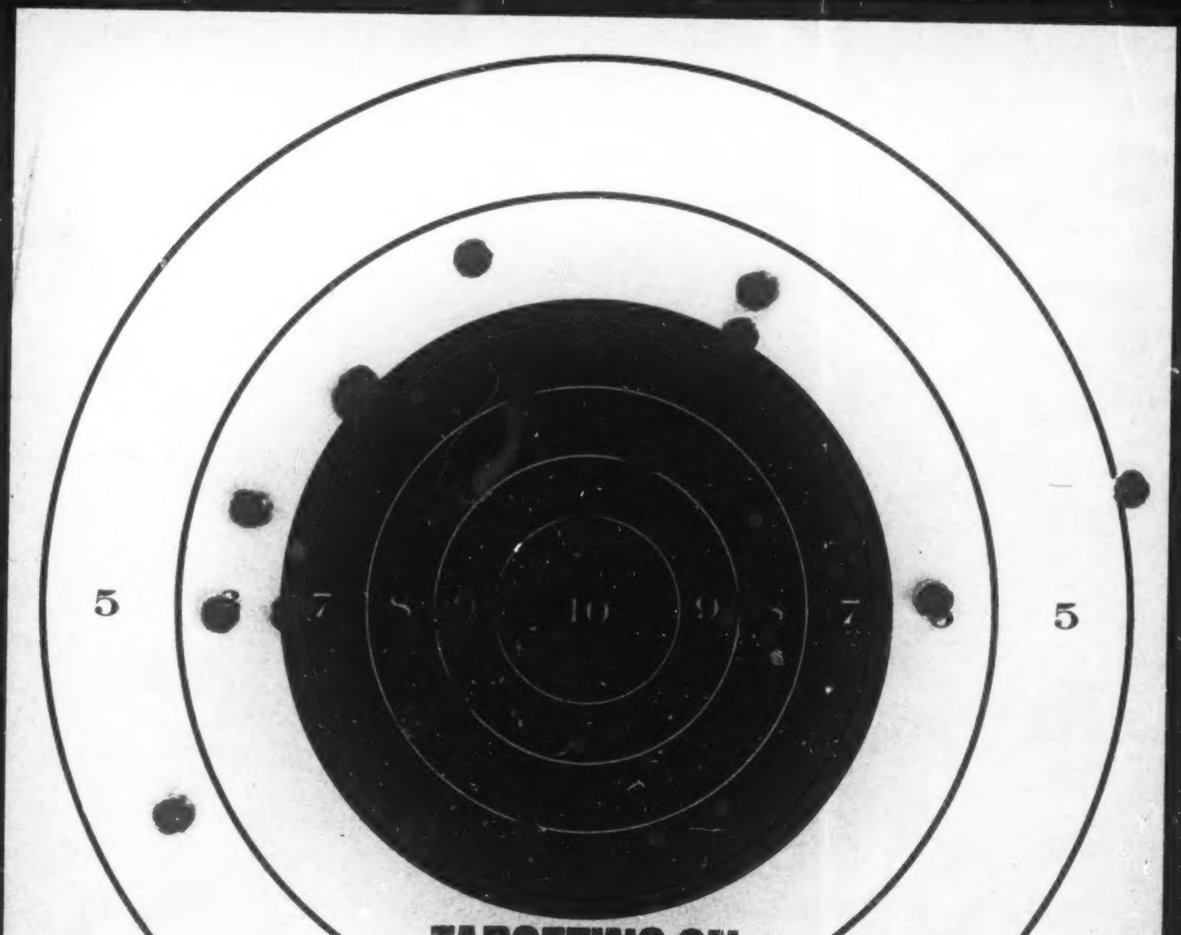
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TARGETING ON STATISTICAL CONTROL

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Bethesda MD 20814

FOOD ENGINEERING

COVER STORY

Statistical process control allows the manufacturer to consistently produce a food product as close to target specification as possible, improving plant efficiency and saving money.

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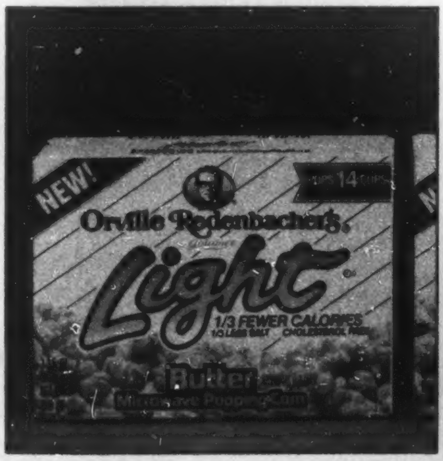

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DAIRY INGREDIENTS
Research in formulating foods with milk proteins must not only concentrate on finding new ingredients but on developing cost effective methods to produce them.

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PACKAGING BUYERS SURVEY

FOOD ENGINEERING'S
EXECUTIVE
ADVISORY
PANEL

PUSHING TECHNOLOGY TO THE LIMIT

Food products that were yesterday's dreams are on grocery shelves today because packaging put them there. Budding technologies are being pushed to their limits and suppliers are expected to meet the challenge.

PATRICIA M. DILLON
Senior Associate Editor

Refrigerated foods and shelf-stable foods are just some of yesterday's dreams that have been made possible with packaging breakthroughs. While food packagers have profited from these innovations, some problems must still be solved to reach the full potential today's packaging systems offer. Members of the *Food Engineering's* Executive Advisory Panel expressed some of these concerns in the annual Packaging Buyers Survey.

For the fourth year in a row, barrier plastics headed the priority list. Approximately 57 percent said it will be a top priority over the next two years. Although barrier packaging has made impressive contributions to shelf-life, our respondents say there is room for improvement. "Better barrier protection!" is the oft-repeated cry. Respondents want improved aroma barriers; grease barriers; thinner films; moisture/oxygen barriers; light barriers; and better thermal stability barriers.

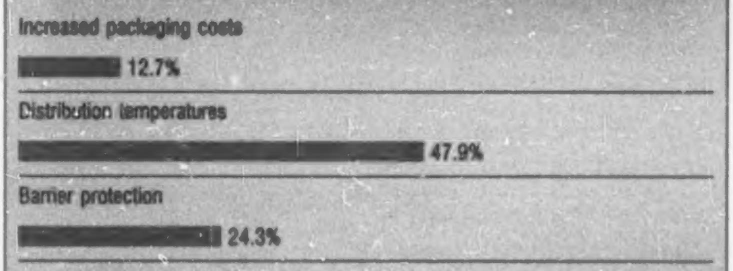
Respondents didn't hesitate to add to a wish list of what they would like to see in the future. "My fantasy packaging material would be a flexible barrier wrapping which would degrade when heated (conventional or microwave oven) to yield safe, edible, innocuous degradation products. It would be used for oven-ready, refrigerated, or frozen products," said a research specialist. Another said, "I'd love a low-cost film with superior moisture vapor transmission rate (MVTR) that runs like a bat outta hell!" And a Midwestern cereal manufacturer seeks a "cereal box that has all the barrier properties so a bag is not needed. It would need a fresh-look type of closure and seal around it. It would eliminate bagging in the bag-in-box (BIB) operation."

A California vegetable processor expressed his desire for a "flexible bag that is heat sealable that has the same barrier characteristics as aluminum foil." Another processor sought a low-cost monolayer, hot fillable, high oxygen barrier (must equal Gamma, Lamicon, etc.), clear and glossy plastic bottle; and this respondent was realistic enough to add that "this is probably not around the corner."

A summary of other requests include: more stable, less costly barrier (water and oxygen) coating for plastic containers;

Refrigerated foods

Respondents were asked what concerned them most regarding fresh refrigerated foods.



Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

Source: Food Engineering Executive Advisory Panel.

Food packagers have recycling on their minds

"Recyclability will grow to be the biggest food issue in the next several years. We need a dual-ovenable package with the strength and rigidity of plastic yet with the recyclability or biodegradability of paperboard," said a midwesterner who participated in *Food Engineering's* Executive Advisory Panel Packaging Buyers Survey.

She was not alone, approximately 37 percent of the respondents said they are already using recyclable packaging and an additional 27 percent said they planned to use it. A Wisconsin manufacturer agreed that recycling "will be the most important criteria for future packaging choices/changes."

Other respondents wanted safe, recyclable plastic or paper with the good qualities of plastic, degradable plastic that can be run at high speeds, greater use of returnable glass and practical recycling for multilayer plastic containers.

A Chicago processor, "would like to see more use of composite materials that are biodegradable. Most plastic containers do not break up in garbage dumps (the old milk carton can be improved)."

While recycling may not always be a primary consideration, it was rarely overlooked by respondents. A Kansas packaging manager wanted stockboard that resists moisture to limit the need for coatings *and* enhance recycling.

Recycling plastic packaging with its multilayers is a complex operation that requires specialized equipment. Although the Food and Drug Administration (FDA) prohibits the reuse of plastic for food packaging, it can be recycled into strong building materials. And it is becoming increasingly clear that the government is holding food processors rather than suppliers responsible for the disposal of packaging.

A pasta manufacturer requested that suppliers "be required to code their packages with the primary recyclable material. This could be etched, blow molded, printed, etc. on the package." A West Coast respondent concluded, "practical recycling for multilayer plastic containers *must* be developed for plastics to continue to grow in volume."

biodegradable barrier film; a single polymer that has the combined characteristics of polypropylene and Saran HB or EVOH protected by desiccant adhesive.

Shelf stable packaging was high on the list for a fresh food producer who said, "I would like to see high barrier, microwaveable recyclable packages and lidding material capable of holding shelf stable products."

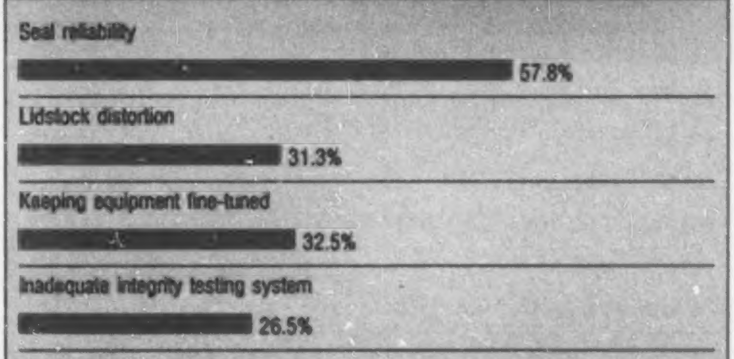
Approximately 26.1 percent of the respondents indicated an interest in vacuum packaging. An aspect of vacuum packaging just taking its first steps in the U.S. is the French technique of sous vide (see *FE*, June '89). Sous vide offers extraordinary taste and quality never before available in prepared foods. The sous vide process involves vacuum-packing fresh raw foods in a pouch, carefully cooking it, then chilling it to 32°F and maintaining this temperature until it is reheated to serve.

CAP/MAP

Controlled/modified atmosphere packaging (CAP/MAP) (see *FE* April and Aug.'89) piqued the interest of 37.7 percent of the respondents as being a viable packaging choice. CAP consists of introducing a gas into the package and sealing it. MAP not only allows gas into the package but lets the product "breath" through its permeable barrier film.

Flexibly-lidded products

Respondents were asked to list problems experienced in production of flexibly-lidded products.



Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

Source: Food Engineering Executive Advisory Panel.

Susceptor use – why not?

Respondents said why they were not considering the use of time/temperature monitors.

Materials, mergers & recyclables

Respondents were asked whether packaging decisions were seriously affected by raw material prices during the last year.

Both the gas and the barrier film is customized to the type of product being packaged. The complexity of CAP/MAP technology apparently caused approximately 24.3 percent of the respondents to say they had problems with films and gas mixtures.

Despite the difficulties, respondents appear ready to press forward with CAP/MAP. A Midwestern product development manager said his company has been using more MAP during the past year. A New Jersey food processor wished for a "metal container that could be used for a chilled food MAP application that would utilize susceptor technology to be able to make a full meal with crispy ingredients, crisp vegetables and a cool dessert. The packaging would prevents sogginess when needed, moisture loss when needed, and heat loss when needed."

Temperature abuse

Besides envisioning the promise of a new generation of refrigerated foods offered by MAP/CAP and sous vide, respondents recognized the potential for disaster. Close to 48 percent of the respondents are concerned that refrigerated foods may not be kept at proper temperatures during distribution, spawning unacceptable microbiological contamination that would pose much more of a threat than pesticide residues ever will.

Respondents demonstrated their awareness of this issue – 58 percent said they were considering the use of time/temperature monitors. These monitors change color when temperature abuse has occurred. Approximately ten percent of the respondents already use temperature monitors on their products.

An Indiana packaging engineer voiced his desire for "a liner material that would permanently change color when exposed to atmospheric conditions."

Of the remaining 32 percent that indicated they are not using time/temperature monitors, nearly half said the present generation of indicators do not fit with their equipment. This sizable percentile presents packaging suppliers a formidable challenge to bridge technology to equipment configurations. The remaining respondents said they were not using time/temperature sensors because of cost and because the technology was not yet reliable.

Tamper-evident packaging

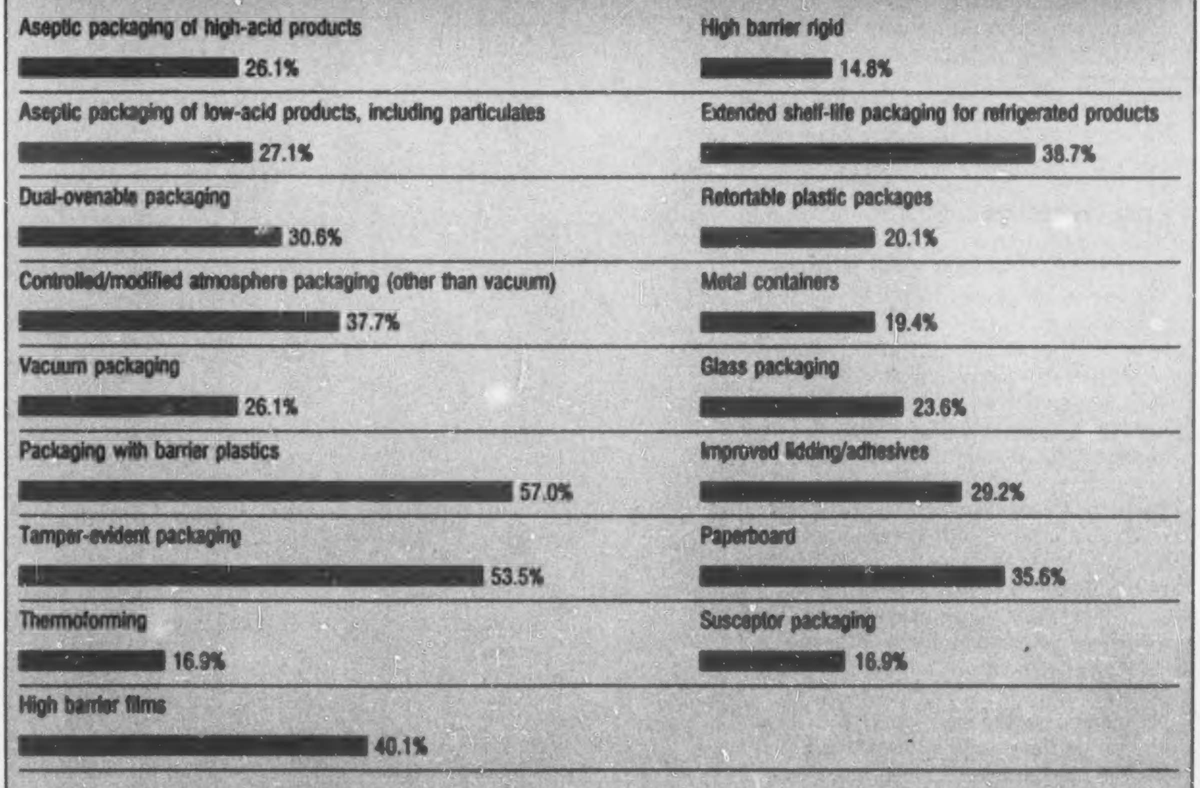
If you think tamper evidence has been put on the back burner, think again. Approximately 53.5 percent of the respondents cited tamper-evident packaging as being of major importance. Most respondents want it as an integral part of a packaging system that is both effective, inexpensive and capable of running at high speeds. A processor said he would like to see development of reclosable packages with tamper-evident seals for pasta products. He added that the low cost of the product makes it difficult to justify the cost of high-tech packaging.

A tomato processing manufacturer called for "a tamper-evident/tamper-proof closure for a widemouthed plastic cup (4, 6, 8 ounces) that is consumer-friendly, fool-proof and does not affect line speed during manufacturing." A Southeastern-based baking company acknowledged that "tamper-proof packaging for a loaf of bread is a major problem" that has yet to be solved.

Convenience is what every food processor knows consumers crave and there's no better way to spell it than M-I-C-R-O-W-A-V-E-A-B-L-E. A Midwest respondent wants to add to the convenience with "a microwaveable carton that changes color when cooking is completed." Another respondent requested "an attractive, microwaveable, disposable container for entrees that can withstand aseptic processing." A New Jersey processor would like packaging to create "crunchy, microwaveable chicken—today's packaging doesn't work."

Important packaging areas

Respondents were asked to check the areas of food packaging likely to be of most importance to their firms over the next two years.



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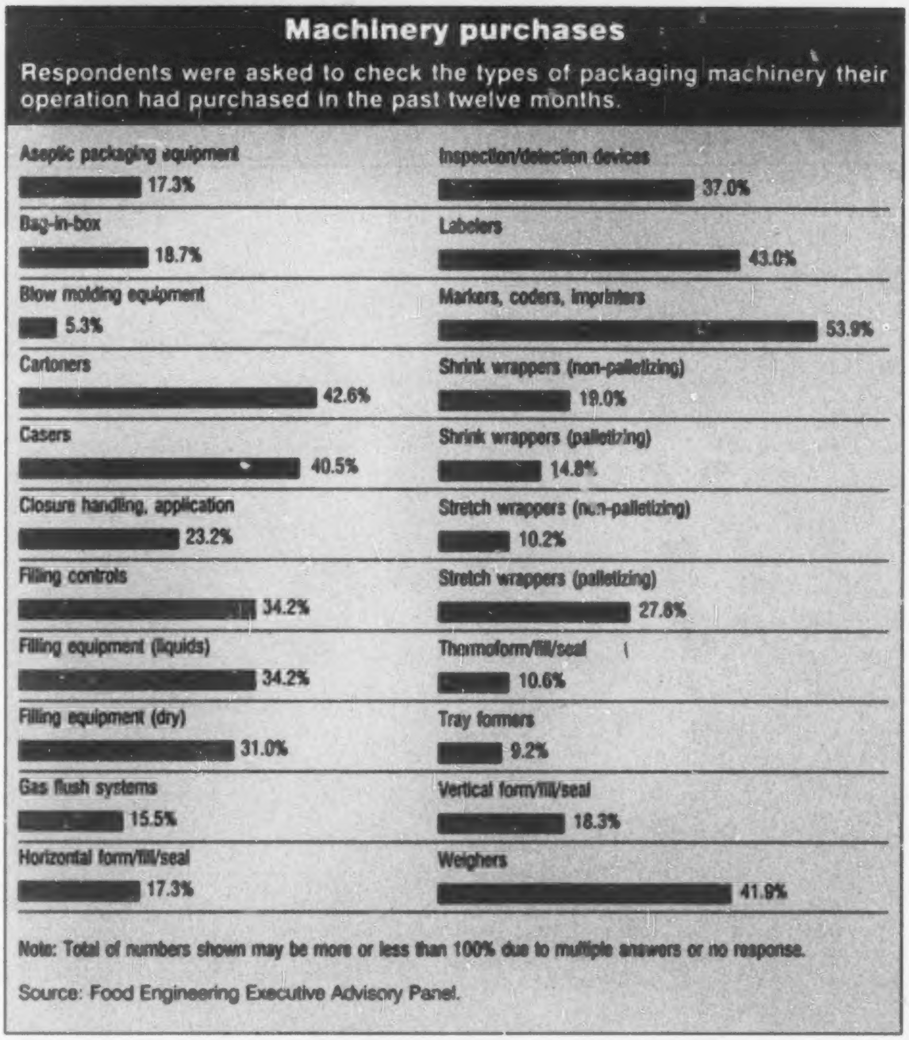
Source: Food Engineering Executive Advisory Panel.



Machinery purchases

Respondents were asked to check the types of packaging machinery their operation had purchased in the past twelve months.

Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

Source: Food Engineering Executive Advisory Panel.

That chicken may be coming. In fact, as microwaving becomes more sophisticated, many of the requests for uniform browning may soon be fulfilled. And active needs on processors' parts usually produce active materials development on suppliers' parts. Just over half of the respondents reported using susceptor and other metal technologies to enhance microwaveable food performance.

Packaging that can be used in both a microwave and conventional oven was also a popular request. A soup producer who must be a fan of television's *Mission Impossible* put in for "inexpensive, dual-ovenable barrier packaging that would be table-presentable, automatically vent during heating, and somehow automatically trigger its own destruction some pre-set time after microwave or oven heating."

Almost 30 percent of the respondents expressed reservations regarding the present state of affairs in lidding. A frustrated processor is seeking "a plastic tub with decent lid. Right now, industry offers ones with lids that fall off or ones that need two screwdrivers and a pry bar to remove. There should be something in between—maybe a tub with a screw cap?"

A North Carolina consultant asked for "a lidding sealant film with bactericidal and spore killing properties without sacrificing normal characteristics." A major cereal manufacturer would like to see "high flexible packaging equipment with adaptive tooling to eliminate tooling changeovers while running broader range of package types, sizes." As the wish list continues, *FE's* Packaging Buyers Survey shows that food packagers will continue to expect the most from packaging technology. By pushing technology to its limits, today's dreams can become tomorrow's products.

FORMULATING FOODS WITH MILK PROTEINS

Industry acceptance of advances in milk protein research are, for the most part, market driven with economics playing a major role.

Optimum selection of milk proteins for food formulation depends on a number of factors. "You have to custom choose milk proteins taking into consideration the total food system and what you want to achieve such as nutritional enrichment, improved whipping qualities or thickening," explains Jeff Miyake, technical sales, Dairyland Products, Inc. "This includes looking at how the milk proteins will react with other ingredients in the system."

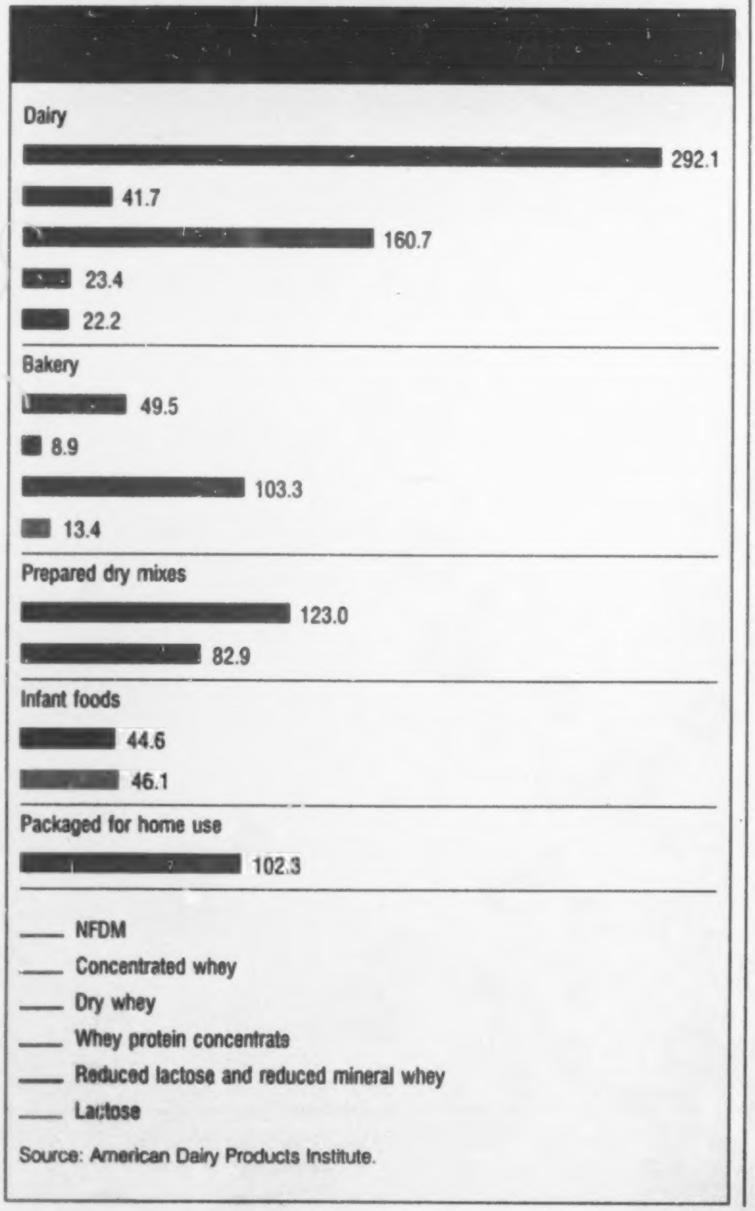
The most plentiful milk proteins available for use as food ingredients are whey proteins since they are a by-product of cheese making. These proteins constitute 20 percent of the proteins in milk. As the functionality and/or other characteristics of whey is improved, more is used in food products.

Total U.S. production of whey and modified whey products for 1988 was 1,712.4 million pounds – an increase of five percent above 1987, according to the American Dairy Products Institute. But sales of whey products for human food during 1988 in the U.S. was 783.9 million pounds – a 0.3 percent increase above 1987.

Caseins, the other milk proteins, constitute 82 percent of total milk proteins. At a pH of 4.5, caseins precipitate in the form of a curd. (Either acid or rennet can be used to precipitate caseins.) Minerals – such as sodium or calcium – are added to neutralize the caseins, which forms caseinates.

In addition to whey and caseinates, milk protein products can be made directly from skim milk. In these products, the whey and casein proteins remain bound together as they occur in milk – giving a higher viscosity when added to food systems. The proteins chains in milk protein isolates can be broken down to shorter chains by enzymes or acid.

ANN E. PRZYBYLA
Senior Editor



Source: American Dairy Products Institute.

The resultant milk protein hydrolysates would contribute to a lower viscosity end product.

Recently, New Zealand Milk Products announced the development of a new process to separate milk proteins. The result is a new line of modified milk proteins with the brand name *AllWhip*. Their protein level ranges from 81 to 89 percent. Although the main function of AllWhip products is to provide aeration, they also provide other functions such as improved body and stability.

Various proteins such as whey, casein, soy and wheat, are often blended to obtain optimum functionality and the most advantageous cost. (When whey and casein proteins are blended, they are not bound together like milk proteins produced directly from skim milk.) Henk Hoogenkamp, director of technical services for DMV Campina Inc. and author of the book—*Milk Protein: The Complete Guide to Meat, Poultry, and Seafood*, gives the three main reasons for blending dairy and other proteins as: cost, convenience and technical (or finding the optimum ingredient in terms of functionality).

Dealing with excess ingredients among challenges faced by dairy industry

Challenges faced by the dairy industry and dairy protein research was the focus of a roundtable conducted by Food Engineering magazine on June 26, 1989 in Chicago. Four experts in this field participated (see photos). Following are some of the highlights of the discussion.

Food Engineering: Has the increased consumption of low-fat milk and the decreased consumption of whole milk resulted in an excess of milk fat? And, if so, what is being done about it?

Dr. Rambo: That is a major challenge. Historically, there's been more research done on milk than any other food ingredient. We have excess lactose which has found some use in pharmaceuticals and baby formulas. And now we have a big surplus in fat and need to find answers. They don't necessarily have to be in the food ingredient area, either.

Dr. Claypool: Our answer so far has been, let's rent another warehouse.

Dr. Hettinga: For many years we dealt with a major surplus of whey, and now we have a surplus of fat. We need to find alternate uses—some of them non-food. Some research involves polyurethane foam and making adhesives for fiberboard, or using the lactose to produce alcohol. And we are currently involved with a project to use fermentation to produce alcohol from lactose for the U.S. Department of Energy.

Dr. Claypool: The dairy industry has been its worst enemy in some cases on this milk fat problem. There's going to have to be an economic signal sent to the producers of milk to select dairy animals which produce less fat. Some animal husbandry experts predict that if economic signals were sent, we might be surprised how quickly biotechnological methods could be developed resulting in cows which produce lower fat milk.

Dr. Lukaas: Dairy farmers are paid on the basis of fat production. Forty or fifty years ago, milk was produced to make butter and the skim milk was fed back to the cattle and the hogs. And the old support system still prevails. There is some talk of the support price being based on skim milk. But for now, the dairy farmer is not interested in lowering the fat.

Food Engineering: Who would make the decision to change the current system?

Dr. Claypool: The individual dairymen through their cooperatives have to participate in a policy that would support component pricing. This would reduce the value of milk fat and result in more products. And, butter would have a lower price, competing with margarine. It would also give processors the opportunity to produce products that are more attractive to the marketplace.

Dr. Hettinga: Although health is a big issue, price has been the biggest problem. Margarine is approximately $1.20 a pound and butter is $1.80 to $2.20 a pound. If that spread was narrowed, more consumers would buy butter.

Dr. Lukaas: The consumer is fickle with respect to nutrition and good health. Price is still a very integral

Dairyland introduced a wheat protein isolate and sweet dairy whey blend during the past year. This blend has the advantage of having a similar protein level to milk at a lower cost. As the protein level increases so does the cost. So, in products other than nutritional ones, the lowest protein level which will achieve the desired functionality should be used.

Soy protein isolates are lower in cost than dairy proteins or wheat protein isolates but have a stronger flavor. Therefore, soy protein isolate and whey blends are a good choice for bakery products where other ingredients mask the taste of the protein.

Production quotas for dairy products in Europe

Traditionally, many European governments have subsidized milk production. These subsidies have been reduced, and production quotas for each country were established. As a result, caseinates and other dairy proteins, with the exception of whey, are in short supply. Yet, the functionality of caseinates is desired in numerous applica-

Clockwise, starting with top, left photo: Dr. David H. Hettinga, V.P. for research, technology and engineering at Land O'Lakes, Inc.; Dr. Anthony J. Luksas, president of Dairy Research, Inc.; Dr. Larry Claypool, V.P. of research/QA for Mid-American Dairymen, Inc.; Dr. R. Scott Rambo, director of research for Dean Foods; and Ann E. Przybyla, senior editor for *Food Engineering* magazine.

part of that. By just reapportioning payment to the dairy farmer on the basis of total solids, the sugar value, the protein value and the fat value, part of the problem would be solved.

Food Engineering: What research is being conducted in the dairy field with respect to improved functionality of dairy proteins?

Dr. Claypool: We try to react to the marketplace on a very specific, individual basis. In other words, we attempt to take a given technology or a given dairy ingredient and customize it into whatever the needs are of the food company we're working with. Dairy ingredients can be integrated into virtually every product but you have react to the marketplace.

Dr. Hettinga: An area where you'll see a new market being developed in the future is fractionated fats. Work has been done in this area in Europe but little has been done in this country.

Fractionated fats are used in croissants and cookies. Or, various soft fractions may be used in spreadable, squeezable butter oils.

Dr. Luksas: In fractionating fats, basically as the temperature is lowered, products are centrifuged out. For example, as butter is cooled, a cloudiness caused by crystal formation develops. These crystals are then centrifuged out, and as the temperature continues to be lowered, even more fractions can be centrifuged out. The point is, you could fractionate butter producing quality end products for various applications. The technology is available, but it's uneconomical.

Dr. Hettinga: That is one area where Europe has an advantage. They have developed a number of products, and are able to sell enormous amounts of fat that way.

Dr. Luksas: A technology that we have been involved in is freeze concentration. It can result in the production of specific isolates of whey protein, not only in terms of purity as a whole but also fractionating the whey proteins themselves.

Food Engineering: How does freeze concentration work?

Dr. Luksas: The dairy product is frozen and ice crystals are formed. As this happens components other than the water start precipitating out. And, many of the proteins have their own precipitation point under refrigerated conditions and under specific water activity levels.

An advantage of freeze concentration is that current methods for separation of milk proteins cause some form of denaturation. Even with ultrafiltration surface denaturization occurs. With freeze concentration there is no protein denaturization.

Dr. Claypool: The development of freeze concentration is the result of a joint venture. It is a new approach to funding high-risk dairy research—the dairy industry funds research through the National Dairy Council resulting in a corporation with limited and general partners.

Dr. Hettinga: The final determination of whether the dairy industry adopts a new process will be if the process is economical and the most efficient compared to other methods available. It also depends on the market. If you need a highly undenatured whey protein, freeze concentration may have a very viable opportunity in the future. But it will have to compete with what's available.

tions.

This shortage has resulted in companies looking for ways to reduce the level of casein proteins while maintaining the functionality that they contribute. The combination of European protein technology with U.S. spray drying capability has achieved this by spray drying whey protein and caseinates together, explains Finbarr O'Driscoll, president of Beatreme/Kerry Foods, Inc.

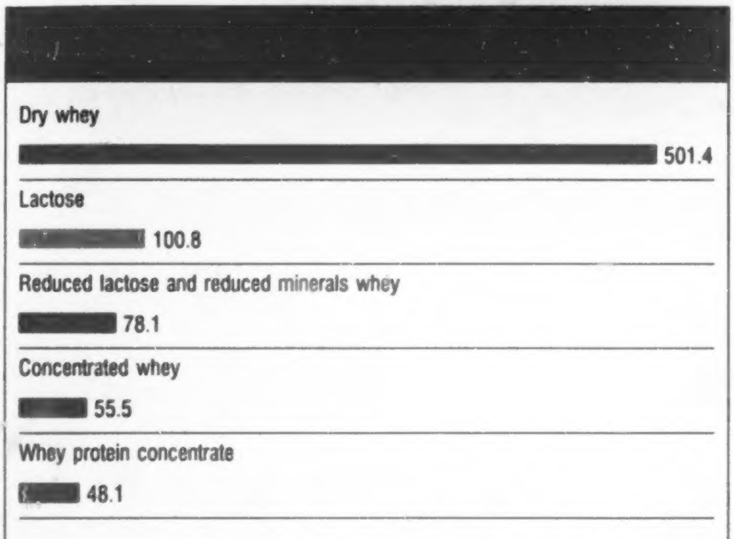
Currently, the percentage of protein required in whey isolates, concentrates and powder is not regulated in the U.S. A general rule of thumb, according to Hoogenkamp, is: 90 percent or higher for isolates, 60 to 70 percent concentrates, and 30 to 35 percent for powder.

Recent development in dairy protein research

A major breakthrough in dairy protein research was announced by The NutraSweet Company last year. Simplesse – a fat substitute – is made from milk protein (whey) and/or egg whites, vegetable gum, lecithin, sugar, acid and water. This premix is then

Product	Protein level	Characteristics	Recommended applications
Whey products:			
Sweet acid whey	Approx. 12% protein; 75% lactose	Offers cost advantage; soluble at pH 4.6	Bakery products, carrier for flavors, frozen desserts, snack foods
Reduced lactose whey	Approx. 22% protein; 50% lactose	Less of a problem with browning of lactose	Cold pack cheese, nutritional feeding products
Reduced mineral whey	Approx. 16% protein	Lower mineral content	Infant formulas
Whey protein concentrate	35-80% protein	Heat sensitive; high solubility; bland taste; increased protein level over regular whey	Egg white replacer, nutritional beverages and/or supplements, acidic beverages, processed cheese, processed meats
Whey protein isolate	90 + % protein	Good nutritional properties; poor solubility	Frozen and aerated desserts, nutritional beverages and foods, diet foods
Lactalbumin	One of the whey proteins	Good nutritional properties; insoluble	Infant formulas; diet foods
Caseinates:			
Sodium caseinate	90 + % protein	Extremely heat stable; more soluble than Ca caseinate; good emulsifier	Whipped toppings, meat products such as sausage
Calcium caseinate	90 + % protein	Extremely heat stable; better flavor than Na caseinste	Milk-based product; low-fat meat products
Blends:			
Caseinate/whey	Approx. 33% protein	Similar protein level to NFDM; proteins not bound chemically as in milk protein isolates, therefore, better emulsifier	Meat products; milk replacer
Whey/wheat protein isolate	Approx. 33-36% protein	Has similar protein level to NFDR	Bakery products
Whey/soy protein isolate	Approx. 33-36% protein	Cost advantage	Bakery products
Other:			
Milk protein isolates	Approx. 90 + % protein	Proteins bound together, therefore, gives higher viscosity	Nutritional beverages
Milk protein hydrolysates	Approx. 90 + % protein, but proteins broken down to shorter chains by enzymes or acid	Lower viscosity, improved whipping qualities	Meat products – especially pump solution for hams, nutritional beverages, aerated desserts
Modified milk protein	81-89% protein	Specifically developed as a whipping aid	Frozen yogurt, whipped fruit beverages, aerated confections, whipped toppings
NFDM	36% protein	Good flavor	Yogurt, cottage cheese, ice cream, nutritional products

Source: Food Engineering Magazine.



Source: American Dairy Products Institute

deaerated, preheated, and spheroidal microparticles from 0.1 to 3 microns are formed using intense agitation and heat. A GRAS petition, accepted for filing by the FDA on November 23, 1988, cites studies showing that the nutritional value of the protein is not altered in the manufacturing process (see *Food Engineering*, March, 1989, p. 71).

Other advances in milk protein research can be seen by reviewing the patents filed in this area during the past few years. These fall into two main categories. The first group is for processes which increase whey's functionality. While the second group of patents describes the production of food products which incorporate dairy proteins. Specifics of some of the patents are described below.

- On January 19, 1988, a patent for *Preparation of Gelled Food Products* was awarded to Nestec S.A., Vevey, Switzerland. A process to prepare thermally gelled emulsions without having to add thickeners or calcium is described. An aqueous medium containing gellable whey proteins is homogenized with a lipidic medium, after which the emulsion is heat treated.

This process may be used for preparing egg custards, omelettes, pancakes, quiches, sausages, jellies, desserts and spreadable creams. (The gellable whey is preferably in the form of concentrates obtained by ultrafiltration of sweet whey, optionally followed by diafiltration [ultrafiltration with dilution], containing from 50 to 90 percent and preferably from 79 to 90 percent by weight of proteins, based on dry matter.)

- On June 13, 1989, a patent for a *Method for producing a pre-proofed, frozen and unbaked dough having an improved shelf life* was awarded to General Foods Corp. (now Kraft General Foods). This patent describes how the addition of a mixture of skim milk and whey proteins is added to dough at a 2.5 to 5 percent level, by weight, for products with less than 30 percent, by weight, of butter, and at a 2.2 percent level, by weight, for doughs with more than 30 percent, by weight, of butter (mainly croissants).

While whey has been used previously to increase shelf life of doughs, the patent's authors say that it has resulted in a negative effect on taste which is not the case with this product. The whey protein component used in this frozen dough is obtained by coagulating skim milk by an organic culture, preferably rennet.

- On November 15, 1988, a patent for a *Low Fat Coffee Whitener and Method for Making Low Fat Coffee Whitener* was awarded to The Pro-Mark Companies, Tulsa, OK. The whitener is made from low fat milk having a butter fat content not exceeding 1.0 percent by weight, preferably less than 0.4 percent, nonfat dry milk solids (NFDM), an emulsifier (preferably a monodiglyceride) and a whitening agent.

The NFDM solids are preferably specially heat modified and are derived from a process in which condensed skim milk is subjected to non-coagulative direct steam heating prior to spray drying. The resultant product is claimed to resemble conventional high butterfat content coffee creamers in appearance, taste and mouth feel but has negligible levels of saturated fat and cholesterol.

- On May 31, 1988, a patent for a *Process for the Manufacture of a Frothy Drink Composition* was awarded to Nestec S.S., Vevey, Switzerland. The process is for the preparation of a powdered mix for a frothy beverage which is prepared from an aqueous solution and suspension of fats, proteins, lactose and other carbohydrates. The suspension is preheated, heated, concentrated, gasified, pasteurized and then spray dried.

Examples of a beverages made by this process would be soluble coffee which is mixed with hot water or hot liquid coffee to obtain a kind of "cappuccino," and a cocoa-flavored beverage. The manufacture of these beverages necessitates ensuring thorough mixing with a liquid.

As research results in new and improved foods incorporating dairy proteins, their appearance on the market will be determined by whether consumers decide that there is a favorable price/value relationship.